AN APPLICATION OF STARK'S FRAMEWORK: IDENTIFICATION AND VALIDATION OF CRITERIA TO EVALUATE SCIENCE COURSE DELIVERY SYSTEMS

By

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If you can trust yourself when all men doubt you,
But make allowance for their doubting too;
If you can dream--and not make dreams your master;
If you can think--and not make thoughts your aim;
Yours is the Earth and everything that's in it.

Rudyard Kipling

I dedicate this study to my parents who gave me life and to Bell who helps make life fun.

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Major Department: Educational Leadership

The purpose of this study was to develop criteria which can be used to evaluate the science course delivery system for baccalaureate allied health students in academic health centers. The need for criteria was justified by a literature review and content analyses of college catalogs and 20 sets of specialized accreditation standards.

Stark's interdisciplinary professional education framework was used to identify the science courses from selected catalogs and structure the proposed criteria. A modified three round Delphi technique was then used to obtain expert opinion and consensus from 21 participants (allied health and basic science faculty and administrators) among seven health center colleges of allied health.

Consensus was defined as 100% or 80% agreement by the last (third) round.

Science courses for allied health students were delivered under a variety of organizational auspices. The criteria identified and validated accomodate these basic structures and are applicable across disciplines, professions, and colleges.

Participants agreed that all science teachers should have a university appointment, demonstrate undergraduate teaching effectiveness, and have a science or related graduate degree. Tenure, senior rank, and a health professions credential were rejected as needed credentials.

College of allied health participants' expectations for science related course faculty included choosing course goals, objectives, and teaching methods plus research. Academic advising, curriculum planning, and accreditation activities were expectations reserved for faculty teaching college sponsored courses. Allied health faculty were expected to recommend goals and objectives and relay accreditation and practice requirements, regardless of appointment status of the science faculty or college sponsoring the course.

College deans were expected to attract faculty but they and other faculty were not expected to identify teachers for specific courses. Deans were not expected to participate in course development.

Specific recommendations for a college of allied health to use in adapting, adopting, and implementing the criteria were provided. Also other organizations for which the criteria could be used were listed as nonhealth center allied health units, other health center colleges, and accreditation agencies. Suggestions for further research were provided.

CHAPTER I

INTRODUCTION

An academic health center (AHC) is an institution that includes a school of medicine, a teaching hospital, and at least one additional health educational program. There are approximately 125 AHCs in the United States, of which 88 and 93 were members of the Association of Academic Health Centers (AAHC) (Association of Academic Health Centers, 1985; 1986). Of these, 60 were reported as having colleges of allied health (Association of Academic Health Centers [AAHC], 1985, 1986).

A comprehensive study of the organization and governance of the 87 member institutions (as of 1977) was initiated by the AAHC in 1977. The report of this study was published in 1980 and consisted of an extensive review of the literature, several position papers, the presentation of descriptive information, and priority issues as described by AHC administrators. Among the 16 major topics addressed were departmental structure/administration and interschool relationships. Conclusions regarding these issues were in part that "inadequate interschool coordination and cooperation often result in significant administrative problems concerning the provision of interdisciplinary education" (AAHC, 1980a, p. 10) and "the organizational

location of the basic science departments and the quality of the teaching program for students in fields other than medicine continue to present problems for those AHCs with several health schools" (AAHC, 1980a, p. 9).

Several studies indicate that the delivery system for basic and applied science courses for health professions students constitutes a major challenge (Association of Schools of Allied Health Professions, 1973; Clarke, 1983; Krieger, 1977; Lewis, 1981; Sirota, 1981). Science core curricula for allied health students have been plagued by accreditation impediments and criticized for insufficient depth and irrelevance (Association of Schools of Allied Health Professions, 1973). Some nursing curricula have been without a pathophysiology course because qualified faculty could not be found or other department faculties were unable or unwilling to teach the content (Lewis, 1981). A survey regarding biochemistry courses for all dietetics programs in the United States revealed courses taught in 17 different departments, little communication between biochemistry and dietetics departments, and marked variation in course duration and content (Sirota, 1981). When Krieger (1977) collected data from allied health faculty in Florida community colleges, many respondents indicated a need to update their knowledge of the science topics on the questionnaire. In a study of medical technology program curricula, deficiencies were noted in pathogenic microbiology, biochemistry, and immunology (Clarke, 1983).

Concerning the administrative location of the basic science departments, in the AAHC governance study (1980b) it was found that they were located in colleges of medicine (n=42), in each of the health centers' schools (n=23), in a health center-wide arrangement (n=13), or in a university-wide system (n=8). Although the researchers did not address basic science faculty qualifications, they did allude to them and recognize the organizational variety by recommendation 25.

> When the basic sciences are centralized, the deans of all health schools with basic science curriculum content should participate in the development of the budget of these departments and in the appointment and promotion of key basic science faculty members. (AAHC, 1980a, p. 10)

Superimposed upon this basic science organizational variety is the complexity of the colleges of allied health. Typically they offer several programs with distinct curricula and unique accreditation standards imposed by different accrediting bodies. Structurally, the colleges may be autonomous entities or subdivisions of larger units such as a college of medicine. In a survey of organizational structure of colleges of allied health, respondents attributed many of their problems, such as course duplication, conflicts with other departments, and inadequate laboratory facilities to organizational structure (Kleinfelter, 1976).

Perhaps in their quest for professionalism or for a theoretical base it is important to note that many of the

allied health professions claim that their practice is or should be dependent on supporting biophysical sciences (Covey & Burke, 1987; Hinkle, 1986). Yet, as noted, investigators have found that science courses for health professions students are beset by problems. The diverse curricular needs of allied health programs for the sciences is complicated by the structural complexity and diversity of the colleges and the basic science departments.

The literature has failed to reveal any common set of criteria upon which a college of allied health (CAH) faculty could evaluate the delivery system for its biophysical science curricular components for students in all programs. Yet there is widespread support for meritorious criteria to be set by experts for the assessment of goals (Fincher, 1978; Koontz, 1971; Nevo, 1983; Roueche, 1976). In a review of the evaluation literature Nevo (1983) wrote "to choose the criteria to be used to judge the merit of an evaluation object is one of the most difficult tasks in educational evaluation" (p. 121). He noted that many evaluation theorists ignore the entire issue of the worth of the criteria by concentrating on data collection to demonstrate goal achievement or by disregarding the judgmental nature of evaluation.

Stark, Lowther, Hagerty, and Orczyk (1986) have proposed a framework for the study of professional degree programs in 4-year colleges and universities. "Briefly, it asserts that professional preparation programs are

influenced by internal, intraorganizational, and external forces" (p. 236). These forces, they claim, interact to create the professional preparation environment which influences educational processes which result in professional preparation outcomes. The outcomes consist of two categories, professional competencies and professional attitudes. Several elements of the former category, namely conceptual competence, concern the goals of the biophysical sciences in allied health curricula.

Thousands have participated in the development of this framework. From 1 through 4 authors plus contributors have been identified on publications relative to the development of this framework (Stark & Lowther, n.d.). For simplicity throughout this research report the framework will be referred to as "Stark's." No discredit is intended to the other researchers.

Problem Statement

The purpose of this study was to identify and validate criteria using Stark's framework, that can be used to evaluate the delivery system for science related courses for baccalaureate allied health students in academic health centers. Criteria were identified and validated to answer the following questions:

1. What professional and academic qualifications should science related course faculty have?

2. In what roles should science related course faculty engage?

3. What control should the college of allied health dean and faculty have in the evaluation of science related course faculty who do not have primary appointments in the college?

4. What control should the allied health faculty and dean have upon the delivery and content of science related courses?

Operational Definitions

Academic health center (AHC) is defined as an institution that includes a school of medicine, a teaching hospital, and at least one additional health educational program. A synonymous but older term is academic medical center.

Adaptive competence is the ability to anticipate and adapt to changes (e.g., technological changes) important to the profession (Stark et al., 1986).

Allied health is an umbrella term with many definitions. In this study it refers to those occupations which are health related and have educational programs in colleges of allied health, such as medical technology, physician assistant, and respiratory therapy. This excludes most of the older, independent, or more established occupations whose practitioners prefer not to be so considered and whose programs are usually not under the

auspices of colleges of allied health. Examples are dentistry, medicine, nursing, and pharmacy.

Allied health faculty are instructors with a health science credential and a primary appointment in a college of allied health, who teach baccalaureate level allied health students in the classroom.

Allied health professional is one prepared in an allied health occupation at the baccalaureate or higher level.

Basic science faculty are instructors who teach one or more science related course to baccalaureate level allied health students. They usually have a graduate degree in a biophysical science, do not hold a health professional credential, and may or may not have a college of allied health appointment.

Clinical practice refers to professional/technical work at the service site by faculty or students when a client/patient is directly or indirectly the recipient of care.

College of allied health (CAH) is an academic unit of a university or academic health center with more than one allied health educational program, a faculty, and administrative personnel. Such units are sometimes called school or division. The term college will be used to refer to all colleges, schools, or divisions of allied health in AHCs.

Conceptual competence is the understanding of the theoretical foundations of the profession (Stark et al., 1986).

Contextual competence is the understanding of the societal context (environment) in which the profession is practiced (Stark et al., 1986).

Criteria are written statements on which a judgment or decision may be based. In this study, criteria are distinguished from standards and guidelines in that the latter are specifically for the purposes of accreditation.

Delivery system relative to the science related courses refers to those elements such as faculty, nonhuman resources, locus of control, and organizational structure which are antecedent to the presentation of the courses.

Department chairperson is the academic leader who represents the faculty of one or several programs. A particular program may be the responsibility of a department chairperson or a program director. The older term, chairman, may be retained to report those studies in which that term was used.

Guidelines are written narrative which serve to extend, explain, and clarify accreditation standards. They are not absolute.

Health professional is a global term used to describe all professional personnel involved in patient care (direct, administrative, educational, or research) in patient care

facilities, or in public health, or environmental health activities. This includes allied health professionals.

Integrative competence is the ability to integrate theory and practice (Stark et al., 1986).

Interpersonal communications is the ability to use written or oral communication effectively (Stark et al., 1986).

Professional courses are those theoretical and practical required subjects which result in the student being able to demonstrate prescribed competencies i.e., to practice the profession. This includes all professional phase required courses except those identified as science related.

Program is a curricular system designed to educate persons to function in a particular health profession.

Program director is a person responsible for the teaching, administration, periodic review, continued development, and general effectiveness of a program.

Research is an activity that treats the substance of one's discipline/profession in a creative and scholarly manner and communicates the knowledge gained from that work so that it is available to the discipline or profession as a whole.

Scholarly concern for improvement is the degree to which a graduate recognizes the need to increase knowledge through research (Stark et al., 1986).

Science related courses (SRC) are basic or applied biophysical science subjects which health professions students take during enrollment in the professional program. The published catalog descriptions for these courses indicate that a major expected outcome is the development of conceptual competence. This excludes prerequisites, clinical practice, social sciences, and professional or technical methods courses.

Service refers to all professional faculty activities not defined as teaching or research. These activities may include committee work, accreditation activities, clinical practice, and service to the profession or community.

Standards are written statements by which educational programs are reviewed, surveyed, or evaluated for purposes of accreditation. They are generally binding for accredited programs. Some accrediting agencies use the terms, essentials or criteria. In this dissertation, all such statements will be called standards.

Teaching includes preparation for, evaluation of, and all student contact hours associated with a given course, module, or lesson.

Technical competence is the ability to perform tasks required of the profession (Stark et al., 1986).

Delimitations and Limitations

The college population of interest consisted of 60 colleges of allied health, within academic health centers

that were members of the AAHC (AAHC, 1985, 1986). The program population of interest included all baccalaureate programs in AHCs administered by the college of allied health except nursing, pharmacy, or social work (Occasionally these are organized within the same colleges.). Allied health programs within the university but outside of a CAH were excluded. For example, dental hygiene programs in CAHs were included, those in dental colleges were not.

The panelists who participated in the development of the criteria consisted of three subgroups, CAH deans, basic science faculty, and allied health faculty. Students and individuals who taught exclusively in the clinical area were not included. The strength of the criteria formulated were a reflection of the appropriateness of the framework developed by Stark et al., the literature review, and the expertise of the panel experts.

One limitation results from developing criteria general enough to apply to any biophysical science course for any baccalaureate allied health program. Other studies are usually limited to one science or a few allied health programs. While this might simplify the situation it would defeat the purpose of this study. It was not the intent to compare among sciences or programs. At issue was the development of criteria that any professional could use to evaluate the science course delivery system for

baccalaureate allied health students in colleges of allied health in academic health centers.

The operational definition of a science related course is both asset and liability. The term is unique. The grouping of what may be labeled basic, applied, fundamental, bridge, clinical, or professional sciences under one category may appear artificial (Thier, 1987). This may represent an unfamiliar way of viewing the allied health curricula. This may be perceived as an impingement on professional course "turf" or the attenuation of science. The courses may be difficult to identify in programs that use an integrated curriculum, that is, basic science and professional content combined in one course.

The validity of the aggregation of these courses is a function of the methods used to identify them and the assumptions on which these methods rest. In brief, a group of experts determined that the course descriptions met a criterion of the Stark et al. framework. This assumes that the framework and expert opinion have validity. The framework will be discussed in Chapter II. Its use in the identification of science related courses will be explained in Chapter III.

Critics may claim that there were already several sets of criteria for the evaluation of allied health programs, i.e., accreditation standards. This was correct. The Committee on Allied Health Education and Accreditation (CAHEA) accredited via its constituents 26 allied health

programs and each had its own set of standards (American Medical Association [AMA], 1987). In addition to this, several programs found in colleges of allied health such as dietetics, dental hygiene, and physical therapy were accredited by other agencies.

Program accreditation is most representative of professional practice concerns (Hinkle, 1986). Various sets of standards are intended to address the biophysical sciences vaguely, narrowly, or indirectly and from their own unique perspectives. It is no wonder that deans of CAHs consider "accreditation standards . . . giant stumbling block[s]" (McTernan, 1972 p. 168). Furthermore, it is questionable if faculty of colleges of allied health in AHCs should measure their biophysical science course delivery success by accreditation standards (Schermerhorn, 1986). Of 3,042 programs accredited by CAHEA only 672 were in 4-year colleges, universities, or medical schools (AMA, 1986, p. 244). Often the same standards are used to evaluate programs in hospitals, community colleges, proprietary schools, blood banks, government institutions, and AHCs.

Procedures

Study Design

A review of the literature was undertaken regarding academic health centers, colleges of allied health, and their faculty and administrators. Accreditation standards for 20 health professions were examined. Mission statements

and goals claimed by several AHCs and their universities and colleges of allied health were reviewed. Using Stark's framework as a guide, the literature review was focused to identify and define further biophysical science in the curricula.

From the literature review statements were formulated upon which the science related course delivery systems in colleges of allied health could be evaluated. These statements were critiqued by three experts; one allied health dean and two faculty who teach science related courses to health professions students. After all had reviewed the material, each expert was interviewed. The statements and supporting information were revised and prepared for a three round modified Delphi study with the panel experts.

The Delphi technique is recommended for use with problems that do not lend themselves to precise analytical techniques. It is suggested as a method of choice when communication among diverse peoples must be facilitated but time and cost preclude group meetings. It was a method used in the academic health center governance study cited previously (AAHC, 1980a, b). The Delphi will be explained in Chapter III.

Selection of the Colleges

The colleges were in centers that were AAHC members during 1985 or 1986. They were autonomous or distinct divisions of other colleges and offered three or more

generic allied health programs. Every effort was made to include at least one center representative of each of the four possible basic science department structures. Ten colleges, which were public, private, and geographically dispersed around the nation were then selected as representative leaders by two deans of allied health and the investigator. Eight deans of the 10 colleges nominated indicated their willingness to participate.

Selection of the Panel

The purpose and method of the study was briefly explained by letter to 10 deans. They were told the purpose of the study, why their college was chosen to participate, and their role. A follow-up telephone call was made to answer questions and learn of their willingness to participate. The 8 who agreed to serve were selected. Program confirmation and faculty nominees were also requested.

The panel consisted of 21 experts; deans, basic science faculty, and allied health faculty from among the colleges. Broad disciplinary input was encouraged by the instructions provided to the deans for nominating faculty (see Appendix B). Identification of 4 faculty per CAH insured substitutes should some choose not to participate. It also permitted the investigator to select for diverse disciplinary and professional representation from all of the colleges. For this reason, 1 through 5 persons per institution were invited by letter to participate.

Role of the Panel

After review by the preliminary study experts and after revision of the statements, the statements as well as supporting information were distributed by mail to the panel members. Panelists were asked to indicate their agreement or disagreement with each statement and contribute opinions. Inclusion, exclusion, or revision of any item was determined by a preset score. This procedure is discussed in Chapter III. Panel members were asked to reevaluate and respond to the same and additional statements on a second and third round. From the literature and panel expert opinion the criteria that may be used to evaluate elements of the science related course delivery system were developed.

Significance of the Study

The fact that science related course delivery for allied health students is often a challenge is indisputable (Clarke, 1983; Krieger, 1977; Sirota, 1981). Furthermore the location of an allied health program in an academic health center--the citadel for health sciences education--need not ameliorate the problems. "The organizational location of the basic science departments and the quality of the teaching program for students in fields other than medicine continue to present problems for those AHCs with several health schools" (AAHC, 1980a, p. 9).

Literature of the older health professions shows a consistent pattern of efforts to incorporate the basic

sciences into the varied curricula and improve the delivery of such courses. In advocating laboratory and not just lecture of the basic sciences for medical students, Flexner (1910) stated

> after a strenuous laboratory discipline, the student will still be ignorant of many things, but at any rate he will respect facts: he will have learned how to obtain them, and what to do with them when he has them. (p. 68)

In her treatise on nursing education, Goldmark (1923) noted: "Common defects of scientific instruction in the training schools studied are the lack of good teachers, the neglect of laboratory work, and the insufficient allowance of time" (p. 257). Obviously recent as well as classical studies of the education of students of the health professions have shown concern for the quality and quantity of the biophysical sciences be they labeled basic science, applied science, or professional courses.

Organization of the Study Report

Chapter I has provided background information and justification for a study to develop criteria that can be used to evaluate the science related course delivery system. Chapter II is a review of the related literature. It encompasses three general areas: (a) Stark's theoretical framework upon which this study was based, (b) literature about academic health centers, colleges of allied health, and science course delivery systems, and (c) content

analyses of accreditation standards and college of allied health catalogs.

Discussed in chapter III is the methodology employed to select the participants and identify the science related courses. Also explained is the Delphi technique and the data collection and analysis. Chapter IV is an analysis of the data obtained while developing the criteria. Lastly, Chapter V is a discussion of the resulting criteria, their implications, and recommendations for further research.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this chapter is to provide an overview of academic health center sponsored colleges of allied health, their structure, faculty, and curricula pertinent to science course delivery systems. It is divided into the following sections: (a) an overview of academic health centers; (b) information and studies about colleges of allied health, faculty, and administrators; (c) a review of Stark's framework for professional education; (d) an analysis of specialized and proposed college-wide accreditation standards; (e) a review of college of allied health catalogs; and (f) a review of studies relevant to the delivery of science courses for allied health students. Literature pertinent to the methodology of this study will be addressed in Chapter III.

Academic Health Centers

Academic health centers (AHC) have evolved from a confluence of several entities within American society. A comprehensive review would entail a discussion of higher education, the education and training of physicians and other health professions, the teaching hospital, and the

health care delivery system. The development and synthesis of these subjects was beyond the scope of this study. But an overview is mandatory since the colleges within this study were all AHC sponsored, and this has major implications for the science related course delivery system.

The genesis of AHCs occurred during the latter 19th century (Ginzberg, 1985). Prerequisite to this were advances in the basic sciences; chemistry, physiology, immunology, and bacteriology (Ludmerer, 1983) and the concomitant clinical discoveries such as anesthesia, asepsis, and the roentgen ray (Friedson, 1973). The physicians of the leading medical schools of the day, already university affiliated, began to seek closer alliances with the hospitals where these new technologies could be taught (Ludmerer, 1983). Medical education focused on the undergraduate and research was secondary (Ginzberg, 1985).

With the opening of Johns Hopkins University in 1876 and Hospital in 1893, the role of research gained momentum (Ludmerer, 1983). In 1910, the now luminary Flexner report, gave impetus for medical school faculties to pursue closer affiliations with both universities and hospitals (Ashley, 1976; Ludmerer, 1983). During the early decades of the 20th century the university-teaching hospital-medical school triad became well established (Ashley, 1976; Ludmerer, 1985). Nurses and other workers who might later be known as dietitians or medical technologists were trained on the job,

in hospitals (Ashley, 1976; Friedson, 1973). Allied health occupations which trace their origins external to hospitals and independent of medicine, such as occupational therapy, moved into the hospital and became physician dominated during this period (Savitt & Kopperl, 1982).

After World War II these centers for medical care and education began to undergo major changes (Hogness & Akin, 1977). Factors inducing change were the perceived need for collegiate nursing and allied health educational programs, the medical schools ambition to expand the clinical teaching sites to veterans and community hospitals, the universities responsibility to coordinate and integrate the expanding health related activities, and policies of the federal government (Ebert & Brown, 1983).

Petersdorf and Wilson (1982) identified three overlapping post-World War II phases in AHC development, recognizable by governmental influences. The biomedical research era commenced in the middle 1940s when government leaders decided to rely primarily on academia to conduct biomedical research. Federal financial support began to contribute immensely to the expansion of basic science departments (Ginzberg, 1985; Petersdorf & Wilson, 1982). This facilitated specialization in the clinical departments and the provision of intensive tertiary care for referred patients in the teaching hospitals.

The health manpower era began in the late 1950s with reports and studies in which the authors called for more

physicians and medical schools (Petersdorf & Wilson, 1982). These reports were catalysts for passage of the Health Professions Education Assistance Act in 1963. This legislation, later amendments, and manpower acts which followed provided money for facilities and training of more health professionals. This era peaked in 1971 (Ginzberg, 1985).

Petersdorf's, public service era began in the 1960s. By this time AHC faculty had trained hundreds of physician specialists who had or would follow the middle class migration to the suburbs. Given their quality training, it became less necessary for these physicians to refer clients. For the AHCs, this translated into smaller patient pools and declining hospital admissions, heretofore the sine quo non for the "cash cow," i.e., the teaching hospital (Ginzberg, 1985). This manifestation of success coupled with more general social phenomena; a decline in city services, urban traffic congestion, civil rights movements, and increased minority and indigent populations; facilitated a demand for more responsiveness to the local community.

Now the AHC leaders, with their world view, renowned biomedical research programs, and graduate and graduate medical education emphases were being forced to compete with community hospitals for paying patients and respond to the primary health care needs of their neighborhoods (Rogers & Blendon, 1978; Sloan & Valvona, 1986). "In 1948, 70 percent of the patients cared for at Johns Hopkins Hospital were

referred from outside the Baltimore area--indeed, often from abroad" (Rogers & Blendon, p. 946). Thirty years later this situation had been reversed, "80 percent of the patients admitted came from a 16-km. radius of Baltimore" (p. 946).

Rather than diagnose, treat, and cure cases of typhoid fever, tuberculosis, and poliomyelitis, the health professionals and their teaching hospitals now care for victims of trauma, cirrhosis, and acquired immunodeficiency syndrome (AIDS). The nonbiological etiology of many of todays diseases lie outside of the germ theory of disease and the domain of traditional medicine (Rogers & Blendon, 1978). In addition to problems posed by present day epidemiology, the AHC is also challenged by "problems in organization and governance" (AAHC, 1980a, vii).

There is no list of common characteristics of AHCs and therefore no absolute agreement on how many exist (Ginzberg, 1985). But experts concur on the dominant role of the college of medicine (Morris, 1980; Petersdorf & Wilson, 1982) and on the crucial relationship of academic medicine with the teaching hospital (Ebert & Brown, 1983). Their overall missions; research, service, and teaching are technically congruent with the universities of which most are a part.

However the AHCs and in particular their medical colleges service commitments far surpass in intensity or scope that of other professional schools. Colleges of law, education, and business do not conduct the courts, the

public school system, or the stock exchange. But colleges of medicine dominate the teaching hospitals (Rogers & Blendon, 1978). This business enterprise necessitates considerable interface with the community. The centers may have millions of dollars invested in their physical plants and may employ thousands of modestly skilled workers (Wilson & McLaughlin, 1984). Health center scientists, physicians, and scholars turned administrator may be working with zoning boards, insurance agencies, union negotiators, and city planners (Rogers & Blendon, 1978).

Internally AHC governance "tends to be decentralized, ad hoc, and vested in small committees" (Rogers & Blendon, 1978, p. 944). The decision-making process is slow and cumbersome (Ginzberg, 1985). Ideally leaders are expected to engage in teaching, research, and patient care as well as administer the departments and center-wide affairs (Weisbord, Lawrence, & Charns, 1978). To compound the difficulties of governance on all levels, "the autonomous medical science culture tends to value technical far above interpersonal and group skills" (Weisbord et al., 1978, p. 303).

In the recent past AHC faculty and administrators enjoyed the National Institutes of Health grant monies. They still do, but these funds are now abating (Ebert & Brown, 1983) and diminishing in real dollars (Ginzberg, 1985). Social legislation of the 1960s converted many indigents into insured citizens who with Medicare or

Medicaid could pay for medical services deemed necessary by any physician. This has now been capped with a prospective payment system, which became effective in 1984 (Schramm, Renn, & Biles, 1986). The intent was in-hospital cost containment. Some of the affects have been staff reductions, fewer diagnostic tests, and shorter lengths of stay. Relatively more health care is being delivered outside of the traditional voluntary teaching hospital. For the AHCs, these changes have increased competition among health care agencies and providers.

By 1950 the American physician professor had become as respected as his 19th century German counterpart (Ludmerer, 1985). The intimate medical school-teaching hospital alliance had been fought for and won. Medical deans were called to Washington for advice (Rogers & Blendon, 1978). But all of this is changing. Physicians are now called to Washington and told they are unresponsive to society and not meeting its needs (Evangelauf, 1986, 1987; Rogers & Blendon, 1978). Coordination among the hospital(s) and all of the center colleges is more complex. Nursing and allied health, largely subordinate to medicine, and pharmacy, and dentistry, primarily isolated from medicine are demanding a greater part in AHC affairs (Henderson, 1980; Morris, 1980).

The watchwords now are for improved interpersonal, professional, and public relations. The call is for better rapport between the AHC and its university (Hogness & Akin,

1977), government (Rogers & Blendon, 1978), and faculties (Christensen, 1978). The solutions demand effective leaders (Petersdorf & Wilson, 1982) who are possibly selected by a set of criteria different from the past (Christensen, 1978). They should be capable of strategic, proactive planning and not just respond to each crisis (Ebert & Brown, 1983; Wilson & McLaughlin, 1984). Today's AHC leaders may disagree over the role of specific occupational groups in health center governance but many are advocates of an improved application of the social sciences and humane arts. One administrator with responsibility for encouraging this is the vice president for health affairs.

Today most AHCs have such an officer (AAHC, 1980b). This person's presence (or absence), responsibilities, and style have a direct bearing on colleges of allied health. The authority and roles of the vice presidents are as diverse as the AHCs they orchestrate (Pellegrino, 1975). Petersdorf and Wilson (1982) describe three typologies. In one, the dean of medicine serves as vice president, and in another, the vice president serves the president in a staff capacity. Lastly, the vice president may be a line officer with all AHC deans administratively reporting to him or her. Christensen (1972, 1978), a dentist, believed that a line vice president fosters professional interaction and believed nonphysicians should be considered for the post. Of 182

vice presidents who served between 1960 and 1976, 20 or 16% were not physicians (Wilson & McLaughlin, 1984).

The stance of academic physicians toward the vice president position is mixed. The physician, Hogness advocated a strong line vice president, in part to improve coordination of the curriculums of the various health science schools (Hogness & Akin, 1977). In a discussion of leadership and medicine, Wilson and McLaughlin (1984), described a population of "322 individuals who served as dean of a medical school . . . and 98 individuals who served only [emphasis added] as vice president" (p. 42). "Medical school deans also are not enamored of the concept of the dean and the hospital director being directly accountable to the vice president" (Petersdorf & Wilson, 1982, p. 1157). And "vice presidents are probably here to stay, but" (Petersdorf & Wilson, 1982, p. 1161) they "must not 'run' the medical school" (Pellegrino, 1975, p. 227). One area of agreement is that the authority and responsibility of the vice president should be consciously decided and made known to all concerned (Pellegrino, 1975).

The perceived threat to college of medicine autonomy and control which the vice presidency poses for some (Hogness & Akin, 1977) is accompanied in the literature by references to college of medicine dominance within the AHC (Morris, 1980, p. 156; Wilson & McLaughlin, 1984, p. 63). "Academic health centers are dominated by their medical schools . . . no other health-professional school has very

much influence on the academic health center" (Ebert & Brown, 1984, p. 1201). "Leadership positions in academic health centers must be defined according to two professional dimensions . . . medicine and . . . management" (Lostetter, 1981, p. 10). The college of medicine, "more than any other component influences the character of the center <u>because it encompasses the major biomedical science base</u>" [emphasis added] (Petersdorf & Wilson, 1982, p. 1153). Where does this situation find colleges of allied health and their science related course delivery system?

<u>Colleges of Allied Health</u>

<u>Emergence of the Allied Health Professions</u>

The curriculum of colonial day Harvard was based on the classical trivium and quadrivium (A. Levine, 1978). During the first 2 centuries of American higher education, science as a field of study gradually gained acceptance. This occurred with changes in the existing curricula and by the establishment of new institutions and new curricula that provided for modern as well as classical courses (Rudolph, 1978). The basic sciences did not always carry credit comparable to classical subjects because the former were considered lacking in academic rigor (A. Levine, 1978). The secondary status of the basic sciences all but ended in the late 1800s with the leadership of Harvard's President Eliot, who demanded equity for science with his elective system and got it (Warfield, 1901/1971).

Beyond academia, agrarian America needed citizens with practical skills and this intensified with the rise of industrialization in the 19th century. The sons of traders, farmers, and craftsmen needed to know more to perform more complex tasks. Gradually some of the colleges and universities began to apply knowledge from the basic sciences to practical problems. Thus, in a delayed but parallel trend with the basic sciences, the applied sciences slowly became part of American higher education (A. Levine, 1978).

The 19th century saw the development of the "middling" classes (Bledstein, 1976). Aspirations of the common citizens were for an improved station in life, material gain, and social prestige (D. Levine, 1986). The application of science by the universities coupled with this quest for upward mobility permitted the vocational-technical-practical occupations to gain access into higher education. Schools, colleges, and programs of engineering, agriculture, business, and education were instituted and flourished. Their graduates then as now, learned a trade, received professional status, and entered the middle class (D. Levine, 1986; Friedrich, 1982).

Medicine, dentistry, pharmacy, and nursing have participated in this movement from apprenticeship into higher education (Brown, 1983; Grace, 1983; Mrtek, 1976). The emergence of most of the allied health professions and their subsequent migration into higher education is

essentially a 20^{th} century and often post-World War II phenomenon (Ford, 1983). Several situations and events have influenced the development of the specific allied health occupations and each has its own history. But they all arose to satisfy a need created by the larger society, or some combination thereof.

McTernan (1972) summarized a typical cycle in the formation of an allied health profession. First there is a need at the work site, so an available and intelligent person is informally trained. Next, individuals are trained on-the-job in several institutions. These people develop common interests and form an organization. Later they seek occupational identity and finally professional status. To acquire this they advocate higher educational standards. Slowly the training programs shift from the job sites to the educational institutions.

Common to most allied health occupations was the early participation of members of more established professions, namely medicine for medical technology (French, 1974), radiologic technology (Soule, 1974), and physician assistant (Howard & Lewis, 1974); nursing for occupational therapy (Johnson, 1974), respiratory therapy (Collier & Youtsey, 1979), and physical therapy (Scully, 1977); and dentistry for dental hygiene (Hein, 1974). But the allied health occupations were also fostered by librarians [medical record administration] (Pandolfo, 1977), pharmacists and engineers [radiologic technology] (Soule, 1974), artists and social

workers [occupational therapy] (Johnson, 1974; Savitt & Kopperl, 1982), and physical education teachers [physical therapy] (Scully, 1977).

Today students of allied health occupations are trained in a variety of settings (AMA, 1986). In 1986 the Committee on Allied Health Education and Accreditation (CAHEA) of the American Medical Association accredited 3,042 programs in 25 fields (AMA, 1986). CAHEA classified sponsors in five typologies: (a) hospitals, clinics, and blood banks; (b) community colleges and vocational schools; (c) senior colleges, universities, and medical schools; (d) proprietary schools, consortia, and secondary schools; and (e) government institutions. Between 1981 and 1985 CAHEA accredited programs increased by 37. Two hundred and forty-four hospital programs closed or discontinued accreditation and 202 additional programs were accredited among community colleges (AMA, 1986b). Thus the recent shift has been from hospitals to community colleges and not senior institutions, including AHCs. The largest segment of allied health students are trained in community colleges (Ford, 1983). Only 10% graduate from programs in AHCs (Ebert & Brown, 1983).

<u>Descriptive Studies of the Colleges</u>

Descriptive information about health professions faculty and their colleges have been available for years for nursing and pharmacy (American Association of Colleges of Pharmacy, 1986; National League for Nursing, 1986). But for

allied health many have deplored the lack of data (National Commission on Allied Health Education [NCAHE], 1980; Year-end Highlight, 1986-1987). Given the confusion over the definition of allied health (AMA, 1985a; Anderson, 1981; Foegelle, 1984; Ford, 1983; Jacobsen, 1977; NCAHE, 1980) this is perhaps unavoidable. To correct this void a major objective of the American Society of Allied Health Professions strategic plan for the 1990s is the development of an allied health data base ("Deans' winter conference," 1987-1988).

Relative to educational institutions, this investigator found two major sources of allied health demographic and descriptive data, dissertations and professional/ accreditation association documents. Because of subtle and salient differences in the data collection and analyses among the associations, data comparisons are often inappropriate. Furthermore, the associations vary in their willingness to share data with nonmembers.

Rosenfeld (1972) was among the first to describe the educational settings of allied health programs. Regardless of sponsor, he described three organizational patterns based on administrative and budgetary control. Kleinfelter (1976) named these structures, independent, dependent, and coordinated. The independent structure has "all the prerogatives afforded the other schools and faculties" (Rosenfeld, 1972, p. 19). The dependent structure "is part and parcel of another school or department, such as a school

of medicine or biology department in the university" (Rosenfeld, 1972, p. 19). The coordinated structure is an amalgam "of several other schools or departments under [a staff] . . . administrative officer" (Rosenfeld, 1972, p. 19).

Kleinfelter (1976) queried the chief administrators of 118 American Society of Allied Health Professions member institutions to determine characteristics of the allied health units and compare findings based upon organizational structure. Ninety-two (77.9%) participated, 70 from 4-year institutions and 22 from 2-year institutions. The names and titles of the allied health units and chief administrative officers varied. The number of programs in each unit ranged from less than 3 to more than 15, with a plurality of 6 through 9.

Seventy (76.1%) of the respondents listed problems which they attributed in part to organizational structure. These included lack of autonomy, inadequate budget, insufficient space, absence of a distinct faculty, course duplication, and conflicts with other departments. Kleinfelder summarized the characteristics of the units based upon their structure and recommended a formal administrative structure, an adequate financial base, and coordination to prevent duplication and conflicts. A conclusion was that the more control the allied health unit had, the fewer the problems. He recommended that "courses taught in other colleges or departments should be utilized

as much as possible for didactic instruction" (p. 116). This seems contradictory with his other recommendation that allied health schools "should strive for as much autonomy as possible in all administrative and academic areas" (p. 116).

Wise (1979) studied the organizational structure, as conceptualized by Hage, of schools of allied health located in AHCs. She developed three sets of questions, which were sent to 83 vice presidents, 54 CAH deans, and 200 department chairs. Of 129 departments, 37% awarded more than one degree, 70% awarded a baccalaureate, and none reported doctoral programs. Several (20.3%) offered more than one level of a particular major. Dual enrollment of students from other institutions occurred in 17.9% of the departments. Some programs were offered in the AHCs but external to the CAHs and others were sponsored by the university but were external to the AHC.

"The deans reported 41% of the faculty . . . possess a bachelor's degree as the highest degree" (p. 85). This did not include clinical faculty. Faculty with academic or professional doctoral degrees constituted a mean of 32.4%. Among the department heads 45% held master's degrees and 40% held doctorates, nearly 75% were licensed/certified in a health profession. Eighty-two percent of the deans held doctorates, typically outside of the allied health fields they were administering. Most (71.4%) did not have a health professions credential.

Appraisal of the decision-making responsibilities of the department heads was assessed primarily by student and clinical issues. Over half (51.9%) reported they did not make decisions concerning student clinical progress and in more than one-fourth (28.9%) of the departments students were responsible for locating clinical facilities for the required practicums. About one-fourth of the chairpersons reported that clinical faculty participated in some [college] departmental affairs. Reasons purported for these findings were the relative autonomy of the clinical facilities, program accreditation held by the clinical facilities, no reimbursement from the universities to the clinical facilities, the relatively rapid and recent shift of programs into the university setting, and abdication of student clinical education by the universities.

Nearly 20% of the allied health department heads did not report administratively to the dean, but reported to other department heads, medical directors, or vice presidents. Some (17.8%) did not represent their own allied health field in administrative affairs. A medical director or other appointee may assume this role. Reasons posited by Wise were the current or recent hospital identification of the programs and the fact that hospital employees are typically not participants in administrative matters.

Fourteen percent of the deans reported no tenure and promotion policy for faculty. Those who did, ranked the criteria considered most important; teaching ability,

acquisition of an advanced degree, and continued education of self. Least important were research, publication, and professional consultation. Sixty-two percent of the department heads "reported that more than 10% of the university [college] faculty are engaged in research" (Wise, 1979, p. 88).

Wise concluded that the education and decision-making roles of the department heads varied widely, as did their titles (curriculum director, program director, administrator, chairman) and department names (division, program, name of occupation). Her findings confirmed dual lines of authority, administrative complexity, and diversity of the departments. Wise concluded that CAHs are "decentralized, very complex, . . . stratified, and may be formal or informal" (p. v.).

Kelley (1975) studied professional identity among occupational therapy, physical therapy, and medical technology baccalaureate program faculty and deans from 10 American Society of Allied Health Professions member colleges. The colleges were geographically dispersed and representative of all three organizational structures. She interviewed all of the deans and surveyed the faculty by mailed questionnaire. Returns were received from 176 (71%) faculty.

Issues the deans believed most important concerned course and faculty development and resource acquisition. They expressed mixed but moderate support for

interdisciplinary activities. Some felt it difficult for faculty to work in interdisciplinary endeavors because of different professional emphases or faculty disinterest. They favored greater faculty identification with the concept of allied health. Efforts to promote this included, "interdisciplinary committees . . . and schools set up separately from their medical schools" (p. 52). There was no agreement on the purposes of the core curriculum, if it should be used, or the courses to be included. One dean believed differences in student perspectives and abilities among the programs precluded the usefulness of core curricula.

No research was being conducted in three colleges and no faculty members were conducting interdisciplinary research. The deans concurred that allied health faculty were not research oriented. They agreed that research interests and patterns differed among the three professions and that physical therapy tended to be most active. Three expressed the need to develop a research focus in their college and many believed their college mission statements needed revision. One dean mentioned the lack of academic sophistication; faculty were "basically practitioners . . . they wanted to be told their objectives" (p. 59).

The faculty in this study were full-time (79%), female (67%), under 40 years of age (52%), and prepared at the master's (68%) level. Eighteen percent had a doctoral degree. Most of the part-time faculty also had an

appointment in the college of medicine and/or a basic science department. The faculty occupied the junior faculty ranks (70% assistant professor or below), a plurality (41%) had taught less than 5 years, and 57% had practiced 10 or more years.

Faculty attitudes concerning interdisciplinary endeavors differed significantly (p. <.05) among the allied health fields and among the colleges. Attitude differences were not significant when faculty were grouped by CAH organizational structure, highest degree level, discipline of highest degree, full or part-time status, academic rank or title, years of clinical experience, or years of teaching experience. Actual participation in interdisciplinary endeavors differed with academic rank and age. The higher the rank and the older the faculty member the more interdisciplinary activity.

Professional reading habits among the faculty differed markedly by discipline. Medical technologists read more in the basic sciences, physical therapists read more in diagnostic and treatment areas, and occupational therapists read more in mental health and rehabilitation. Consistent with reading habits were faculty publication histories. They published in the journals they read, which were rarely interdisciplinary. Nine percent had produced more than 10 publications, 46% had not published.

When asked to identify problems, deans mentioned external, resource (space, funding, and faculty), or

political issues. Other challenges concerned pressure to upgrade the faculty or the development of core curricula. No dean mentioned internal administrative difficulties.

Faculty identified far more problems in scope and quantity. These included curricular issues, administrative difficulties with clinical site staff and facilities, and personnel management within the colleges. Kelley (1975) wrote that faculty did not share their deans concerns, for their development. But, workload, time for self-development, and research were listed as problems by approximately 20% of the faculty.

The faculty, Kelley concluded, may lack academic sophistication and research skills but they exhibit generous concern for teaching and clinical affairs--activities which a research "university environment de-emphasizes" (p. 154). Although distinct differences among the three faculties were found, they shared a limited interest in interdisciplinary activities and they had not "enlarged their identities to include other allied health professionals" (p. 158). The deans, 80% of whom did not hold an allied health credential, favored a broad allied health identification.

Frank (1984) identified personal and professional characteristics of allied health administrators of institutions accredited by CAHEA and the Southern Association of Colleges and Schools. Participants included 61 administrators of 2-year and 38 administrators of 4-year institutions. Typically the administrators of the 4-year

colleges held the title dean, were male (65%), white, had a mean age of 47 years, and held a doctoral (76%) degree. Their undergraduate degree was commonly in a physical science, masters in a health field or business administration, and doctorate in education. Twenty-six claimed licensure in a health field, 11 in medicine or nursing, and 15 in an allied health area. They reported to a vice president of health affairs, supervised 8.2 programs, had 9 years of prior teaching experience, and had published 2.6 papers during the prior 2 years.

Anderson (1981) surveyed department chairpersons of baccalaureate medical record administration, medical technology, physical therapy, and radiologic technology programs. The purpose was to determine how the chairpersons used their time, how they evaluated teaching, and their beliefs about teaching. The population contacted was 213; 162 or 80% responded.

Most chairpersons (85.7%) had acquired their position by administrative appointment; seven (4.3%) had been elected by the faculty. Eighty-one percent of the departments had six or fewer full-time didactic faculty including the chairpersons. Three departments had no full-time faculty; over half (55.3%) used one or more part-time didactic teachers. The typical annual student enrollment was 11 through 40.

All but three department chairpersons ranked administration or teaching as the activity that occupied

most of their time. Administration was ranked first by 68.9%. Teaching was given second place by 60.2%, service third by 73.4%, and research occupied the least amount of time for 82.0% of the chairpersons. The relatively liberal amount of time occupied by administration and minimal time devoted to research is consistent with other studies about allied health faculty activity (Foegelle, 1984).

Chairpersons were asked to indicate, which among ten methods of teacher evaluation they used with their faculty. Student opinion (94.9%), review of course materials (85.5%), and measures of student achievement (81.1%) were reported most frequently. Those least used were team teaching (46.8%), classroom visitation by colleagues (32.1%), and review of audio-video tapes (12.1%). Qualities considered most important in teaching were the ability to encourage thought (54.6%) and the ability to explain clearly (15.9%).

By a chi-square analysis (p.<.05), major differences across programs were identified on several dimensions such as program size, chairperson reading habits and degree, and grading policies for clinical courses. Methods to evaluate teaching effectiveness also varied significantly across programs. Most frequently used were classroom visitation of colleagues by physical therapy, measures of student achievement by medical technology, and review of course materials and examinations by medical record administration. Reasons for these differences were not studied but they appeared congruent with clinical practice among these

professions. Physical therapists are accustomed to direct patient care; medical technologists are associated with diagnostic testing, i.e., outcome measures; and medical record administrators deal with the written record.

Foegelle (1984) identified personal, occupational, and career patterning characteristics of 435 full-time, college of allied health faculty from 16 academic health centers. Fifty-nine percent had had 6 or more years of prior clinical experience; about half (51.5%) had taught in a university for less than 5 years. Over 13% had a secondary appointment in another college, which for six individuals was in a science unit. Administrative appointments were reported by 37.2%, most of which were at the program level. The primary assignment for most faculty was with baccalaureate programs (62.1%) and with entry level occupational preparation (77.5%). Faculty from clinical laboratory, physical therapy, and occupational therapy programs accounted for 43.5% of the respondents.

Foegelle tabulated faculty activity by 24 categories. He concluded that the faculty members were primarily involved in student centered activities, namely classroom teaching, clinical teaching, and student advising. Service to their respective programs and professional associations occupied more time than clinical service. Scholarship and research typically consisted of "analyzing existing knowledge and applying it to their own unique or special situations or circumstances" (p. 78).

The second most frequently reported activity was "personal professional development" (p. 75). Two-thirds were pursuing additional formal education. Faculty reported preferring to spend more time on publishing (77.4%), research (69.9%), personal development (64.9%), and paid service (52.4%). Their "inservice development interests were strong in the area of research" (p. 187), moderate in higher education and health care topics, and "not at all in teaching and advising topics" (p. 100).

Over one-half (51.0%) reported original career goals different from their present occupation. Over one-third (35.4%) had been at their present institution less than 5 years. The reasons faculty gave for selecting their universities were duties and responsibilities of the job (80.0%), geographic location (57.2%), and ready for a change (35.2%). Thirty percent "were seriously considering or actively pursuing a change in employment" (p. 92). Major reasons were salary (61.3%), potential for advancement (45.5%), ready for a change (45.5%), duties and responsibilities of the job (44.7%), and policies and practices of administration (37.9%).

In summary, Foegelle (1984) noted that allied health faculty "are typically underprepared for higher education faculty roles . . . and they have administrators who are often not able to be first among equals in their own academic units" (p. 180). He stated that the "considerable . . . time invested in administrative activities" (p. 189)

was incongruent with the relatively few "formal [extra-program] administrative appointments" (p. 67). His major plea was for faculty development, which would have to involve

> improving research and service skills, and the inculcation of values for scholarship, stewardship, and collegiality. This focus will require a special emphasis on conceptual and interpersonal skills, all of which are quite different from technical--clinical skills inherent in allied health occupations, and all of which are learned in quite different ways. (p. 191)

Current Status of Colleges of Allied Health

The allied health professions developed for practical needs, not abstractions (Hinkle, 1986). The knowledge base of the different occupations is diverse, often undefined, immature, lacking in theory, or dependent upon a paradigm claimed by another profession (National Commission on Allied Health Education [NCAHE], 1980). Until the practitioners acquire a theoretical base, the hospital tends to serve as the training site (Rosenfeld, 1972). The professional societies serve as vehicles for occupational identity, and one salient manifestation of this is specialized accreditation (Friedson, 1986). College-wide missions have been reported as nonexistent, both formal and informal, and in need of alteration (Miller, Beckham, & Pathak, 1983).

College administrators have generally supported greater autonomy for allied health education (Florida Board of Regents, 1983; Pyne, 1975). But advocacy for independence seems to have abated during the 1980s. Given their

dependence on other units for facilities and course work, colleges of allied health within academic health centers may be among the most vulnerable (Barritt, 1980; Ford, 1983; Morris, 1980). Cooperation, communication, and collaboration; successful themes of earlier decades have been confronted with financial exigency (Ford, 1983). One now reads: "Deans' Winter Conference to Focus on Survival of Allied Health Units in Higher Education" (Deans' 1987-1988).

Program interrelationships are complex (Wise, 1979). Titles may not be reliable indicators of function, profession, or role. Studies of department chairs result in reports about program directors (Anderson, 1981). Many departments have four or fewer members and would be considered programs by most higher education administrators (Tucker, 1981). Goals of individual programs may be unrelated to or in conflict with each other or with college-wide goals. Examples include educational entry level, professional practice turfs, and accreditation (Hinkle, 1986). Many members of the older health professions continue to view members of the younger allied health professions as subservient (NCAHE, 1980).

Unlike most professional school deans, allied health administrators often do not share education, experience, or occupation in common with their faculty (Foegelle, 1984; Frank, 1984). This may partially explain the greater value the deans attribute to the generic allied health concept, interdisciplinary activity, and core courses (Kelley, 1975

McTernan, 1972). The motivators to espouse these objectives may be organizational, financial, or faculty developmental and less concerned with a common body of knowledge needed for professional practice.

Financial and authoritative relationships between the colleges and other units are equally complex (Wise, 1979). Faculty practice plans or hospital budgets may contribute toward faculty salaries or student stipends. Conversely, the colleges may reimburse clinical agencies or other colleges for services and facilities. The influence of the college of medicine is reflected administratively as well as professionally in CAH faculty responsibilities (Kelley, 1975; Wise, 1979). The allied health educational programs "have relatively low status in the very types of academic institutions (for example research universities, health science centers) that could play the greatest role in developing future leaders and contributing to their knowledge base for education and practice" (NCAHE, 1980, p. 34).

The prime variable which distinguishes among faculty attitudes and behaviors is the allied health discipline (Anderson, 1981; Kelley, 1975). This is consistent with other higher education faculty studies (Clarke, 1983; Stark & Morstain, 1978). Whatever the particular profession, the faculty tend to be practitioners and teachers, not theorists or researchers. The ideological emphasis of CAH faculty has concerned undergraduates and teaching with considerable time

invested in program/professional administration. Women predominate in most allied health occupations (Foegelle, 1984).

The deans have been advocates of more formal and continuing education for their faculties. Faculty developmental interests have been reported to be in research, not practice where most have had ample experience and not teaching where most faculty development activities have been directed (Foegelle, 1984). But there is evidence that this may be changing:

> Our faculty must meet the same standards expected of faculty in any scientific discipline. . . . Whether it is in the biological or social sciences, we must find a scientific base of operation from which to launch basic research in our individual professions. (Covey & Burke, 1987, pp. 3-5)

Stark's Framework

Stark, Lowther, Hagerty, and Orczyk (1986) have developed a conceptual framework for the study of degree programs conducted "in four-year colleges and universities that provide initial socialization and entry to broadly defined professional fields" (p. 232). Because of the recency of this framework, its development will be summarized. This will be followed by a description of the framework and how some of its components can serve to identify science related courses and provide a focus for the development of delivery system criteria.

Stark et al. (1986), as have others, noted that students are increasingly choosing professional rather than

liberal arts majors. Because professional curricula vary markedly it is difficult for administrators to understand each program. But it is essential that administrators develop a working knowledge of the programs they purport to lead. Educators, researchers, and administrators are commonly unaware of the similarities and differences among professional programs; therefore cross-program comparisons lend themselves to investigator bias and use of noncomparable data. Stark et al. (1986) claimed that a standard framework for cross-professional program study would enhance objectivity, accommodate change over time, reduce or eliminate specialized language and the resulting confusion, distinguish between preservice and continuing education, and clarify the often ambiguous meaning of "professional competence" (pp. 232-3).

In developing the framework, the investigators used a grounded theory approach. They reviewed professional education studies and program descriptions, held seminars with different professional faculties, and reviewed the literature on professionalism. Elements of their emerging framework were then compared with themes found in "professional education journals of eleven fields" (Stark et al., 1986 p. 235) including dentistry, medicine, nursing, pharmacy, and nonhealth professions for the year 1979. The revised framework was then used as a guide for a content analysis of 13 specialized accreditation standards including dentistry, nursing, pharmacy, public health, and veterinary

medicine. To determine further if the elements were exhaustive, distinct, and appropriate, a pilot questionnaire was designed to assess University of Michigan "faculty perceptions of each of the elements in the framework" (p. 235).

The Stark et al. (1986)

> framework asserts that professional preparation programs are influenced by internal, intraorganizational, and external forces [see Figure 1]. These forces interact to create a professional preparation 'environment' which, in turn, influences the design of educational processes intended to achieve professional preparation outcomes. . . . Finally the extent to which the outcomes are achieved and, thus, the orientation of the new professionals, influences the internal, intraorganizational, and external forces. (p. 236)

The external influences consist of two major categories, societal influences and professional community characteristics, each of which have several more specific elements (see Figure 2). Elements of the internal influences are grouped under four categories; mission, program structure, curricula tensions, and continuing professional involvement, also shown in Figure 2. Stark et al. (1986) believed that elements of the intraorganizational influences (mission, program centrality, program interrelationships, financial, technological support, and governance) will "become increasingly potent forces affecting professional curricula" (p. 238). Selected elements from among these influence groupings served to

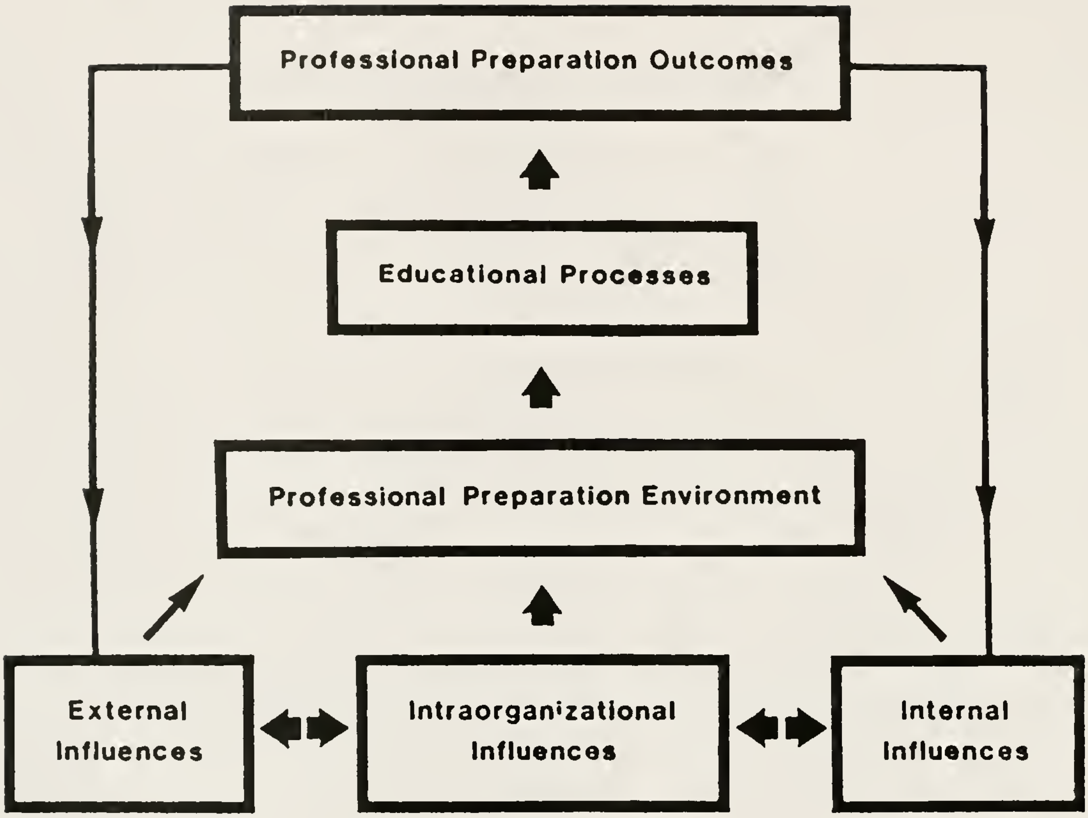

Figure 1. A Framework for Describing Professional Preparation Programs.

Note. From, "A conceptual framework for the study of preservice professional programs in colleges and universities" by J. S. Stark, M. A. Lowther, B. M. K. Hagerty, & C. Orczyk, 1986, Journal of Higher Education, 57, p. 237. Copyright 1986 by the Ohio State University Press. Reprinted by permission.

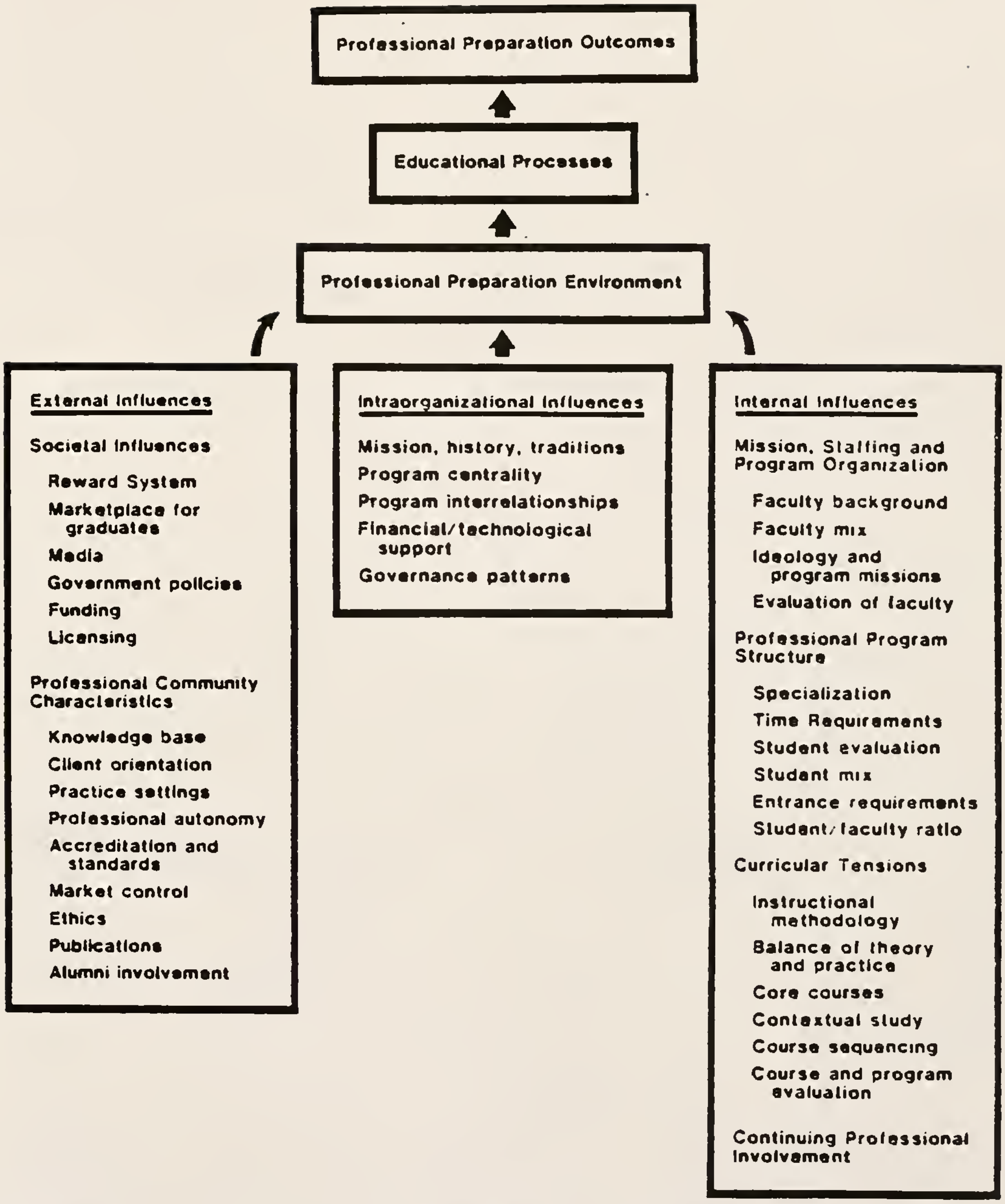

Figure 2. Specific Influences on Professional Preparation Programs.

Note. From, "A conceptual framework for the study of preservice professional programs in colleges and universities" by J. S. Stark, M. A. Lowther, B. M. K. Hagerty, & C. Orczyk, 1986, p.239. Copyright 1986 by the Ohio State University Press. Reprinted by permission.

focus the science course delivery system for this study.

The environment that these influences collate to create, results in educational processes which in turn result in professional preparation outcomes. There are two major categories of outcomes, professional competencies and professional attitudes (see Figure 3). Since the initial publication of the framework, three other outcomes have been specified; leadership capacity, critical thinking, and aesthetic sensibility (J. S. Stark, personal communication, February 10, 1987). The competencies were defined in Chapter I.

As an illustration of these competencies consider a nurse anesthetist as a representative health professional. The nurse anesthetist understands the uptake and distribution of anesthetic agents (conceptual competence), knows how to operate the anesthesia machine and monitoring equipment (technical competence), and can develop a safe and effective anesthesia management plan (integrative competence). She recognizes that the same client undergoing the same procedure in a different milieu (same day surgery unit or hospitalized inpatient) may benefit by different anesthesia management (contextual competence). Also as new agents and monitoring techniques become available she incorporates them into her practice (adaptive competence). In any program the required courses in the curriculum constitute the primary formal mechanism to develop

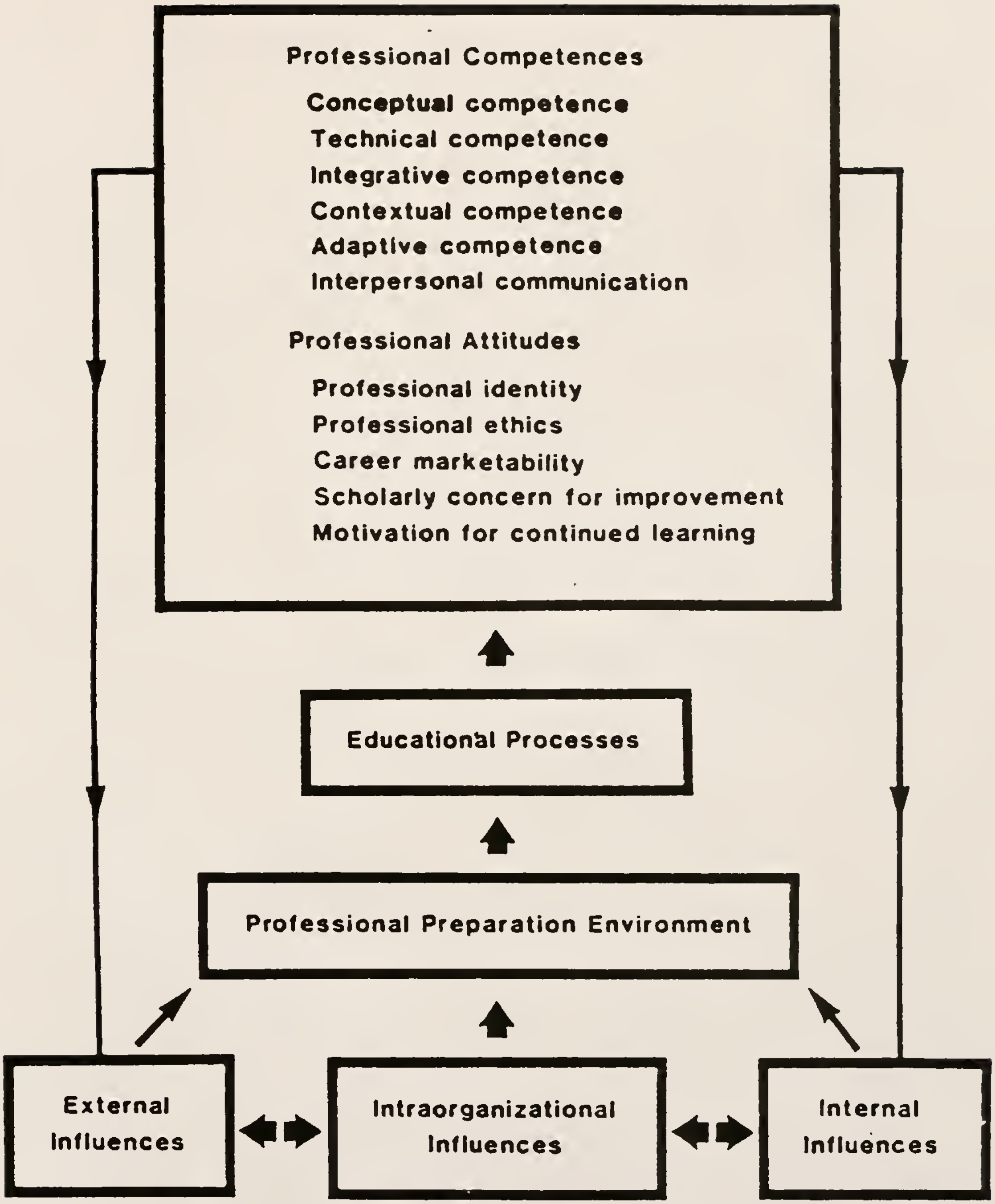

Figure 3. Professional Preparation Outcomes.

Note. From, "A conceptual framework for the study of preservice professional programs in colleges and universities" by J. S. Stark, M. A. Lowther, B. M. K. Hagerty, & C. Orczyk, 1986, Journal of Higher Education, 57, p. 244. Copyright 1986 by the Ohio State University

professional competencies and attitudes. It can be posited that any required course in a professional program will contribute to each of the professional preparation outcomes. However a particular course may make a major contribution to the development of some outcomes and a negligible one toward others. Science related courses can be perceived as fostering the acquisition of conceptual competencies in the biophysical sciences for all allied health students. They may have a limited role in the development of professional identity. This is most apparent in the case of prerequisite basic sciences, core courses, and sciences designed for other health professions students but open to allied health students.

The contributions of a science course toward competence and attitude acquisition may vary with the science and/or profession. For example, the skills developed in the gross anatomy laboratory may contribute little toward the technical competencies that an occupational therapist will use in professional practice. But the skills acquired in the microbiology laboratory may be germane to the activities of a future medical technologist. However in both situations the development of conceptual competence in a biophysical science, supportive of professional practice, remains a primary goal. The other outcomes described by Stark et al. (1986) for which the science related courses may play a pivotal role are in the development of

integrative and adaptive competencies and a scholarly concern for improvement.

To illustrate, consider the nurse anesthesia student as a representative health professions student. A physiology course may include objectives regarding cardiovascular dynamics. The teaching strategies may incorporate a laboratory to demonstrate some of the concepts or a historical discussion of the methodology used by some early investigator who formulated the concepts. Thus, the student derives an understanding of some "knowledge upon which professional practice is based" (Stark et al. 1986, p. 244) (conceptual competence) and recognizes that this knowledge was acquired through research (scholarly concern for improvement). This knowledge of cardiovascular dynamics may provide the basis to perform some technical skill or pharmacologic intervention to maintain blood pressure during the course of anesthesia (integrative competence). Likewise because of a knowledge of cardiovascular dynamics, the future nurse anesthetist will incorporate new technologies when developed to better monitor cardiovascular physiology (adaptive competence).

Stark's framework was used to assist in the identification of science related courses for this study. Recall that science related courses are required professional phase biophysical sciences, the primary objectives of which are to develop conceptual competencies. Secondary objectives may concern integrative and adaptive

competencies and the development of a concern for scholarly improvement. Thus, it was outcome as reflected by the course description, not course name, faculty background, or college sponsor that served to identify these courses. This will be discussed in Chapter III. After the literature review the framework also served to structure the science related course delivery system issues and proposed criteria. This will also be explained in Chapter III.

Hundreds of professional and liberal arts and science faculty have participated in the development of this framework. Its comprehensiveness and multiprofessional applicability have been established. Findings of others using this framework are underway (Stark, personal communication, February 10, 1987) but are not yet available. However the designers of this framework have conducted one study to test this model.

To determine "the ability of the framework to assist in mapping differences among programs" Stark, Lowther, and Hagerty (1987, p. 533) obtained and analyzed a national sample of professional faculty opinion. The specific purpose was to identify discriminators among entry level professional programs and to determine if "each professional field had a unique preparation environment" (p. 533). Faculty (n=2217) of 11 professions in 732 programs among 346 universities and colleges participated.

The variables selected were indicative of internal, external, and intraorganizational influences. Multiple

factor analyses of the data resulted in four groups of factors representative of program influences. They were named Factor 1 curriculum debate, Factor 2 education mission, Factor 3 societal influence/university prestige/gender, and Factor 4 professional community influence/university support. Analysis of variance did confirm that faculty perceptions of professional education preparation environments differed significantly on some of the factors. Three strong discriminants among programs were faculty perception of societal influences (external), social prestige ratings of occupations (external), and gender ratios of program graduates (internal). Strong society support is perceived for programs with predominately male faculty (business, engineering, and pharmacy).

The professional community influences (external) were less powerful program discriminants than the societal. However some items did serve as discriminants. Some program faculties who perceive weak societal support "perceive strong influence from accreditors" (p. 556) (nursing and social work). "Faculty perceptions of having achieved consensus on a professional knowledge base" (p. 557) was a discriminant.

Several potential influences did not serve as discriminants among professions. These included "faculty age, possession of a doctorate, . . .[and] time spent in teaching" (p. 557). Faculty perceptions of the professional preparation environment were found to be independent of

institutional size and type (degree of research orientation), but not professional field.

Clearly this framework is developing into a model that can serve to identify discriminators among professional programs. The finding that profession and not institutional size or type served as a discriminator of faculty perceptions of professional preparation environment was cited as having both research and practical applications.

Accreditation Standards: Tools for Academia

Introduction

Twenty sets of health science professions' accreditation standards and guidelines were perused to determine requirements for program officials qualifications, faculty responsibilities for service and research, and evidence of sciences in curricula. Each set of standards was applicable to a single health science occupation, for which all or some of the programs awarded a baccalaureate degree. Thus a set of standards may apply to certificate or graduate as well as baccaulaureate programs.

Each responsible accrediting agency is recognized by the Council on Postsecondary Accreditation. In 1988, the accrediting agencies and health science professions concerned were the American Council on Pharmaceutical Education (ACPE), pharmacy; the American Dental Association Commission on Accreditation of Dental and Dental Auxiliary Programs (Amer. Dent. Assoc.), dental hygiene; the American

Dietetic Association (ADA), dietetics; the American Physical Therapy Association (APTA), physical therapy; the American Association of Nurse Anesthetists Council on Accreditation of Nurse Anesthesia Educational Programs/Schools (AANA), nurse anesthesia; and the National League for Nursing Council of Baccalaureate and Higher Degree Programs (NLN), nursing.

In addition to these 6, 49 other organizations collaborated with the American Medical Association's Committee on Allied Health Education and Accreditation (CAHEA) to accredit 26 allied health occupations, 14 of which apply to programs with baccalaureate curricula (AMA, 1986). These programs were cytotechnology, cardiovascular technology, histotechnology, medical records administration, medical technology, nuclear medicine, occupational therapy, perfusion technology, radiography, radiation therapy, physician assistant, respiratory therapy, sonography, and surgeon's assistant.

Although the various sets of accreditation requirements address similar issues they frequently use different terms to mean the same thing (AMA, 1985a; American Physical Therapy Association [APTA], 1978; National League for Nursing [NLN], 1980). Also there are nuances among terms, such as, internship, externship, clerkship, fieldwork, and practicum both within and among the professions. Throughout this discourse, the words <u>standards</u> and <u>guidelines</u> will be used consistently, even though a particular agency may use

different terms. Several accreditation documents defined verbs such as shall and should (American Dental Association [Amer. Dent. Assoc.], n.d.; AMA, 1981a). A generalization is that shall, will, and must are mandates; whereas should, could, can, and may are less forceful and suggest ethical obligations, alternatives, or liberty to do something (AMA, 1981a).

Accreditation standards for the occupations under discussion were adopted as early as 1935 (AMA, 1983b) and as recently as 1985 (AMA, 1985b). Of the standards in effect during 1986, 5 sets had been adopted in the late 1970s and the remaining 15 were products of the 1980s. The maximal duration of program accreditation varied from 3 through 10 years, the mode being 5 years (see Table 1).

As illustrated in Table 1, six sets of standards limited program sponsorship to 4-year colleges or universities. The accrediting agency for surgeon's assistant programs suggested sponsorship in schools of medicine in conjunction with the department of surgery (AMA, 1982). The physician assistant agency recommended academic health centers as educational sponsors (AMA, 1985c). Sponsorship of dental hygiene programs had to be in nonprofit postsecondary institutions (Amer. Dent. Assoc., n.d.). "No hospital or other health care facility alone can be accredited as a sponsor of a [respiratory therapy] training program" (AMA, 1977b, p. 2). They had to be part of a postsecondary

Table 1

Maximum Number of Years of Program Accreditation and Minimal Program Duration Requirements

Program	Duration Accred.	Duration of Professional Program in Months
Cardiovasc. Tech.	5	24-12[a]
Cytotechnology	5	12
Dental Hygiene	10	24
Dietetics	5	24[b]
Histotechnology	7	12
Medical Record Adm.	8	not specified[b]
Medical Technology	7	12
Nuclear Medicine	5	12
Nurse Anesthesia	4	24
Nursing	8	not specified[b]
Occupational Therapy	5	not specified[b]
Perfusion Technology	5	24-12[b]
Pharmacy	6	36[b] [c]
Physical Therapy	5	not specified[b]
Physician Assistant	3	24[c]
Radiation Therapy	5	24-12[a]
Radiography	5	24
Respiratory Therapy	5	20
Sonography	5	24-12[a]
Surgeon's Assistant	3	24[c]

[a] Lesser duration for those with prior education/experience.
[b] Sponsorship limited to 4-year colleges or universities.
[c] Duration of program may vary.

educational institution. Sponsorship of the remaining 10 allied health professional programs might include hospitals, laboratories, the military, cancer treatment centers, vocational-technical schools, proprietary organizations, colleges of medicine, community colleges, and 4-year colleges and universities.

Some standards were specific regarding the minimal duration of the programs (see Table 1). Others permitted flexibility based upon student prior experience, ability, or science background (AMA, 1980a, 1980b, 1982). Several just implied the duration by stipulating that most courses would be upper division (NLN, 1980, p. 41) or that the credential awarded would be a baccalaureate degree (American Dietetic Association [ADA], 1976, p. 8).

The number of institutions with accredited programs as well as the number and percent which offered the baccalaureate degree in each health profession is shown in Table 2. The standards examined for dietetics, nursing, and pharmacy were applicable solely to baccalaureate programs. These professions had different or additional standards for other educational levels, e.g., dietetic postbaccalaureate certificate, associate degree nursing, or doctorate in pharmacy. The preponderance of nonbaccalaureate programs in medical records administration, medical technology, nurse anesthesia, occupational therapy, and physical therapy were postbaccalaureate certificate or masters. The majority of

Table 2

Number and Percent of Institutions with Accredited Baccalaureate Health Science [BS] Programs

Program	Institutions		
	Total	N BS	% BS
Cardiovasc. Tech.	0	0	0
Cytotechnology	58	22	37.9
Dental Hygiene	198	27	13.6
Dietetics	65[a b]	65	100.0
Histotechnology	43	2	4.6
Medical Record Adm.	54[a]	52	96.3
Medical Technology	584	187	32.0
Nuclear Medicine	141	32	22.7
Nurse Anesthesia	106	12	11.3
Nursing	453[a b]	453	100.0
Occupational Therapy	61[a]	52	93.4
Perfusion Technology	19	7	36.8
Pharmacy	73[a b]	65	89.0
Physical Therapy	108[a]	96	88.8
Physician Assistant	52	36	69.6
Radiation Therapy	101	7	6.9
Radiography	744	28	3.8
Respiratory Therapy	232	30	12.9
Sonography	24	4	20.8
Surgeon's Assistant	3	1	33.3

[a] Limited to 4-year colleges or universities.
[b] Standards examined apply only to baccalaureate programs.

nonbaccalaureate programs for all other occupations were associate degree, certificate, or diploma.

<u>Program Directors</u>

As shown in Table 3, seven professions' standards required the program director to be credentialed in the occupation and two required either the program director or education coordinator to be a member of the occupation. Four required a member of the profession or a physician/dentist of a relevant specialty. Three permitted the program director to have the same, relevant, or equivalent occupational credentials. Pharmacy standards did not mandate a pharmacist for dean but did require the dean "to demonstrate . . . professional leadership." (American Council on Pharmaceutical Education [ACPE], 1984, p. 4). The remaining standards did not mention requisite professional credentials for the program directors.

The amount and/or level of formal education required of the program directors was diverse (see Table 4). Nursing standards require the chief program administrator to hold a doctoral degree, but only the baccalaureate of this person needed to be in nursing (NLN, 1980). Of the four mandating a master's or ongoing work toward one, dietetics standards permitted the degree to be "in dietetics or a closely related field" (ADA, 1976, p. 3) and nurse anesthesia guidelines indicated that an appropriate master's degree could be in nursing, basic sciences, education, or administration (American Association of Nurse Anesthetists

Table 3

Accreditation Requirements for Professional Credentials of Program Directors

Program	Acceptable Credential
Cardiovasc. Tech.	not specified
Cytotechnology	cytotechnologist[a]
Dental Hygiene	dental hygienist or dentist
Dietetics	registered dietitian
Histotechnology	histotechnologist[a]
Medical Record Adm.	med. rec. adm. or equivalent
Medical Technology	medical technologist
Nuclear Medicine	nuclear med. or equivalent
Nurse Anesthesia	nurse anesthetist or MD
Nursing	professional nurse
Occupational Therapy	occupational therapist
Perfusion Technology	perfusion tech. or equivalent
Pharmacy	not specified
Physical Therapy	physical therapist
Physician Assistant	not specified
Radiation Therapy	radiation therapist
Radiography	radiographer
Respiratory Therapy	respiratory therapist or MD
Sonography	sonographer or MD
Surgeon's Assistant	not specified

[a] Education coordinator or medical director may hold position.

Table 4

Accreditation Requirements for Academic Credentials of Program Directors

Program	Acceptable Credential
Cardiovasc. Tech.	higher than students
Cytotechnology	BS or equivalent
Dental Hygiene	not specified
Dietetics	masters
Histotechnology	two years of college
Medical Record Adm.	masters[a]
Medical Technology	varies with experience
Nuclear Medicine	BS or equivalent
Nurse Anesthesia	masters[a]
Nursing	doctorate
Occupational Therapy	masters
Perfusion Technology	not specified
Pharmacy	not specified
Physical Therapy	not specified
Physician Assistant	not specified
Radiation Therapy	varies with experience
Radiography	varies with experience
Respirator Therapy	varies with experience
Sonography	not specified
Surgeon's Assistant	not specified

[a] Or working on a masters degree.

Council on Accreditation of Educational Programs/Schools [AANA], 1980). Some guidelines contained discussions of program director and/or faculty academic qualifications relative to students (ADA, 1976; AMA, 1977b, 1985c). "Key faculty in any type of professional program should possess the same or higher level of education and/or professional credentials as that for which students in the [respiratory therapy] program are being prepared" (AMA, 1977b, p. 4).

The four sets of accreditation standards which provided for the substitution of experience in lieu of degrees tended to contain detailed discussions of the issue (AMA, 1977a, 1977b, 1981b, 1983c). As an example, qualifications for a radiography program director are that he or she

> Shall be a radiographer qualified in educational methodologies.
> Shall be credentialed in radiography by the American Registry of Radiologic Technologists or possess suitable equivalent qualifications.
> Shall be qualified through education and experience. These qualifications shall assure proficiency in, but shall not be limited to, the following areas:
> curriculum design
> instructional methodology
> testing and evaluation
> educational psychology
> Shall document to the sponsor satisfactory completion of one of the following:
> a baccalaureate or advanced degree with a minimum of two years of postcertification experience as a radiographer and a minimum of two years as an instructor in an accredited radiography program;
> or
> an associate degree with a minimum of two years of postcertification experience as a radiographer and a minimum of three years as an instructor in an accredited radiography program;

> or
>
> a minimum of five years of postcertification experience as a radiographer and a minimum of four years as an instructor in an accredited radiography program. (AMA, 1983c, pp. 3-4)

Directives that faculty serve as role models (ACPE, 1984), have clinical privileges (AMA, 1977b), be actively practicing (AMA, 1983a), or periodically return to practice (AMA, 1981a) indicated the importance of clinical experience. The expectation that program directors and other faculty have prior and/or current work experience was apparent by professional credential requirements (see Tables 3 and 5). The standards of 8 occupations enumerated the years and types of prior experience that the appointed program director must have (see Table 5). Of the 12 that explicitly mentioned prior work experience for the program officer, 2 defined it broadly. The nursing administrator had to have "experience in baccalaureate and/or higher degree programs in nursing" (NLN, 1980, p. 14). "Relevant occupational therapy experience in administration, teaching, and direct service" (AMA, 1983b, p. 3) was stipulated for that profession. The detail to which many of the others described their requirements was expressed by medical record administration standards. The program director, "must have a minimum of three years professional experience at an administrative level in medical record administration in either a health care facility or industry/agency serving health care" (AMA, 1981a, p. 5). The guidelines continued

Table 5

Accreditation Requirements for Experience of Program Directors

Program	Experience Specified
Cardiovasc. Tech.	experience recommended
Cytotechnology	5 years (2 in teaching)
Dental Hygiene	not specified
Dietetics	1 year, 3 years preferred
Histotechnology	3 years
Medical Record Adm.	3 years
Medical Technology	varies with academic degree
Nuclear Medicine	2 years recommended
Nurse Anesthesia	not specified
Nursing	relevant experience required
Occupational Therapy	relevant experience required
Perfusion Technology	not specified
Pharmacy	not specified
Physical Therapy	not specified
Physician Assistant	not specified
Radiation Therapy	varies with academic degree
Radiography	varies with academic degree
Respiratory Therapy	varies with academic degree
Sonography	not specified
Surgeon's Assistant	not specified

that this experience must have been one in which the person was "primarily involved in planning, organizing, directing, controlling, and/or evaluating health record functions" (AMA, 1981a, p. 5).

After professional, academic, and clinical experience requirements, one other often mentioned requirement concerned evidence for instructional competence (AMA, 1980b, 1984). Again these stipulations ranged from general to detailed. "The director has competence in teaching, educational administration, and curriculum development" (APTA, 1978, p. B-3). Or the cytotechnology program director "has completed courses or seminars in the principles of education and management; and has documented continuing education in educational methodologies" (AMA, 1983a, p. 4).

Medical Directors

Of the six professions accredited by non-CAHEA agencies none were required to have a medical director. Although nurse anesthesia standards permitted either a nurse anesthetist or an anesthesiologist to serve as program director as long as a nurse anesthetist "is actively involved in the organization and administration of the total program" (AANA, 1980, p. 31). Dental hygiene standards required program administrative structure to "include a dental hygienist or a dentist with current experience in working with a dental hygienist" (Amer. Dent. Assoc., n.d., p. 4). The CAHEA accredited professions which did not

require a medical director were occupational therapy and medical records administration. Standards for radiation therapy indicated that a medical director/advisor may be required (AMA, 1981). The remaining 11 sets of CAHEA standards required a medical director; 2 of which, medical technology and radiography, permitted the physician leader to hold a different title (AMA, 1977a, unpaged; 1983c, p. 4).

Qualifications of the medical director commonly included licensure as a physician and knowledge, experience, or credentials in the relevant specialty. Several standards also referred to active interest in and involvement in teaching. For example the medical director was to be "experienced and proficient in the use of ultrasound" (AMA, 1980a, p. 102), or "knowledgeable about the delivery of primary care" (AMA, 1985c, p. 3) , or "knowledgeable and effective in teaching the subjects assigned" (AMA, 1985b, p. 3). Or more specifically, "qualified in the use of radionuclides and a diplomate of either the American Board(s) of Nuclear Medicine, Pathology, or Radiology, or possess suitable equivalent qualifications" (AMA, 1984, p. 4).

The general role of the medical director is to insure medical pertinence of the curriculum and often to facilitate public relations among physicians. "The medical director of the program shall provide competent medical guidance to insure that the medical component of the curriculum both

didactic and supervised practice, meets current acceptable standards" (AMA, 1985b, p. 3). Or "the medical/surgical director should provide continuous, competent direction for the clinical relationships with other educational programs. The medical/surgical director should actively elicit the understanding and support of practicing physicians" (AMA, 1982, p. 2).

Program Faculty

Several sets of accreditation standards, such as dietetics, nursing, pharmacy, and physical therapy limited the interpretation and discussion of faculty to appointees of the educational sponsor, who had teaching responsibilities. "Full-time equivalent faculty include only those persons who hold at least a masters degree and are employed on a partial or full appointment by the college or university" (ADA, 1976, p. 6). For dental hygiene, "there must be a core of qualified full-time faculty . . . the majority of the faculty must have full-time appointments" (Amer. Dent. Assoc., n.d., p. 26).

When the standards and guidelines of dietetics, nursing, pharmacy, and physical therapy referred to members of the respective professions who participate primarily in student clinical instruction, it was apparent that the clinicians had a more circumscribed role. "Graduate students who are registered dietitians with practitioner competence may be employed for clinical supervision with guidance from senior faculty; however these students may not

be counted in calculation of full-time equivalent faculty" (ADA, 1976, p. 6). "Volunteer clinical faculty and preceptors should be exemplary role model practitioners, and should reflect a broad spectrum of pharmacy settings" (ACPE, 1984, p. 7).

Of CAHEA accredited programs, sonography, radiography, radiation therapy technology, and occupational therapy standards stated or the guidelines implied that faculty shall or should have a faculty appointment, if the program was college or university sponsored (AMA, 1980a, 1981b, 1983b, 1983c). "Instructors . . . must meet the standards required by the sponsoring institution" (AMA, 1983c, p. 4). Cardiovascular technology, cytotechnology, histotechnology, nuclear medicine, and nurse anesthesia standards did not mention university appointments for program faculty. The latter seemed to equate faculty with anyone participating in student instruction. "Faculty should include "behavioral scientists, educators, other nurses, hospital administrators, and legal experts" (AANA, 1980, p. 31).

Standards for the remaining seven occupations specified or implied a faculty appointment for the program director or officials. The respiratory therapy "program director shall be a member of the sponsoring educational institution's faculty with all rights and privileges" (AMA, 1977b, p. 4). Perfusion technology "program officials should have credentials which allow for faculty appointments" (AMA, 1980b, p. 2). For medical technology the required

program official "faculty appointment may be a regular one, a non-salaried clinical, or courtesy appointment or adjunct" (AMA, 1977a, unpaged).

How ever faculty are defined, all sets of standards contain discussions of the roles and responsibilities of program officers, sponsor employed faculty, and clinical faculty. Typical of content, and typical because it was directed to program officers rather than all program faculty, were "examples of responsibilities of program officials" (AMA, 1977a, unpaged) for medical technology:

1. Development of, validation of, and revision of program objectives when appropriate.
2. Implementation of admission policies.
3. Curriculum development.
4. Implementation of student evaluation procedures.
5. Recruitment.
6. Public relations, including preparation of catalogs, brochures, or other materials relating to the program.
7. Planning and implementation of a program to ensure ongoing instruction in curriculum design, teaching techniques, and current laboratory techniques for all personnel involved in instruction.
8. Maintaining student records.
9. Student counseling.
10. Input into the preparation of the program budget.
11. Providing liaison between the educational program and the institutional administration.

12. Ensuring the medical relevance in the student's educational experience. This may be accomplished in a variety of ways including lectures, seminars, clinical conferences. (AMA, 1977a, unpaged)

Thus teaching and related activities form the bulk of faculty/program officer roles as expressed in these and most other sets of accreditation standards.

The extent to which the curriculum was expected to be controlled by the sponsor employed faculty varied. A few sets of standards made it perfectly clear. "The physical therapy faculty is responsible for instruction and curriculum development" (APTA, 1978, p. B-4). "Primary responsibility for the development and conduct of the academic programs(s) rests with the nursing faculty" (NLN, 1980, p. 26). Other sets of standards vested this responsibility in the program officials. Medical technology "program officials shall ensure appropriate instruction in all areas of the education program" (AMA, 1977a, unpaged). The cardiovascular technology program director "is responsible for maintaining the quality of the program" (AMA, 1985b, pp. 2-3). "The medical director is expected to play a pivotal role in the design, development and implementation of all courses relating to the respiratory physiology and respiratory diseases . . . as well as . . . evaluating . . . non-clinical courses" (AMA, 1977b, p. 6). For dental hygiene, "the program administrator <u>must</u> [emphasis added] participate in . . . curriculum development . . . but the faculty <u>should</u> [emphasis added] participate in

decisions on academic and other policies affecting the program that they will have to implement" (Amer. Dent. Assoc., n.d., p. 5).

Eleven sets of standards required or recommended an advisory committee or community liaison mechanism. Some of these vested major curricular responsibilities in these committees (AMA, 1977b, 1980a, 1981b, 1983c). "The function of the committee should be to advise the program . . . on curriculum" (AMA, 1980b, p. 3). "The advisory committee should play a key role in developing the curriculum . . . [and] periodically review the curriculum" (AMA, 1981b, p. 6). Evidence of a broad scope and potentially political nature of a required advisory committee was found in the respiratory therapy guidelines.

> A well organized, active advisory committee is an important force in evaluating, balancing, and reconciling the diverse interests of the governing board of the educational institution, the institutional administrations, the respiratory therapy faculty, the hospitals, the students, and the community. . . . The meetings of the committee should be attended by a senior executive officer. (AMA, 1977b, pp. 7-8)

As mentioned, teaching and related activities formed the bulk of faculty/program officer roles as expressed in most sets of accreditation standards. Before discussing the sciences that faculty were expected to teach, the standards in relation to faculty service and research are discussed.

<u>Faculty Service</u>

Service responsibilities for health professional faculty encompass two major areas; clinical practice of the

profession and institutional/community service or service to the discipline/profession. In addition to the service implications evidenced by professional credential and experience requirements, all sets of standard contained statements about clinical service. In order for the director of clinical education to perform the instructional and evaluative functions of this position, he or she had to "have a respiratory therapy staff appointment in all clinical affiliates" (AMA, 1977b, p. 5). Physician and surgeon's assistant standards mentioned practicing physicians as primary teachers and role models (AMA, 1982, 1985c). Dietetics standards required faculty to "show evidence of professional growth through continuing education, experience as practitioners, or by other means" (ADA, 1976, p. 5). Dental hygiene guidelines stated that "faculty who provide preclinical technique and clinical instruction must have . . . proficiency in clinical dental hygiene" (Amer. Dent. Assoc., n.d., p. 24). And "a periodic return to medical record practice is desirable" (AMA, 1981a, p. 5). Thus faculty clinical service was addressed in terms of faculty development, that is, continuing education or skill maintenance and in relation to students, such as, role modeling or supervision.

More prevalent than the above examples which support a faculty service role were standards and guidelines which explicitly discussed not responsibility for, but freedom from, service for both faculty and students. "No

[histotechnology] program director should be expected to carry a full-time technical service load" (AMA, 1978, p. 1). "The [radiographic] program director's responsibility shall not be adversely affected by educationally unrelated functions" (AMA, 1983c, p. 3). For nurse anesthesia "provisions will be made to allow an equitable amount of time for class . . . preparation" (AANA, 1980, p. 45).

All accreditation requirements except occupational therapy, physical therapy, nursing, and pharmacy warned against student exploitation in the clinical setting. "Students must not be responsible in any significant way for the service function of the clinical laboratory" (AMA, 1977a, unpaged). Radiography students "shall not take the responsibility or the place of staff. . . . Shifts with limited or repetitious experience may be viewed as exploitation" (AMA, 1983c, p. 6). "The [respiratory therapy] program shall not substitute or permit to be substituted students for paid personnel to conduct the work of the clinical affiliates" (AMA, 1977b, p. 4).

Accreditation requirements for or direct evidence of institutional or community service were generally lacking. In fact, some standards could be interpreted to preclude extraprogram or extrainstitutional endeavors. "The [radiological technology] program director must be exempt from all clinical or departmental duties not directly relevant to the educational program" (AMA, 1981b, p. 4). Dietetics standards addressed faculty service, but in

reference to the program, not the institution or community (ADA, 1976). Medical record administration guidelines limited the program director teaching load to one-half to two-thirds time so "administrative duties within the institution" (AMA, 1981a, p. 4) can be undertaken.

Dental hygiene, occupational therapy, physical therapy, nursing, and pharmacy standards stipulated service to the institution and/or profession (ACPE, 1984; Amer. Dent. Assoc., n.d.; AMA, 1983b, APTA, 1978; NLN, 1980). "The institution provides for [physical therapy] program faculty participation in the governance of the program and institution as well as short-term and long-term planning" (APTA, 1978, p. B-2). "Release [sic] time must be provided for [dental hygiene] professional association activities" (Amer. Dent. Assoc., n.d., p. 27). Nursing, "faculty endeavors include participation in . . . professional activities and community service" (NLN, 1980, p. 36). And "participation in the life of the college . . . and the university, as evidenced by committee service, chairmanship of committees, and involvement in campus governing bodies" (ACPE, 1984, p. 7) is expected of pharmacy faculty.

In summary for most sets of standards, service was restricted to or equated with clinical practice. Faculty clinical practice requirements were discussed as supportive to or necessary for the teaching mission and were not necessarily viewed as worthy ends in themselves. Faculty and student freedom from service was addressed more

frequently and extensively than faculty responsibility for service. Of the six sets of standards which required institutional and/or community service all except dental hygiene limited sponsorship to 4-year colleges or universities and all but occupational therapy were non-CAHEA accredited.

Faculty Research

Accreditation requirements for faculty scholarship and research are salient due to their relative absence. Excluding nursing and pharmacy guidelines, which mentioned such expectations in several contexts, only physical therapy, occupational therapy, and dental hygiene guidelines discussed faculty scholarship. Physical therapy faculty "competence will be evaluated through review of . . . scholarly productivity" (APTA, 1978, p. B-3). "Faculty responsibilities [for occupational therapy] may include. . . research" (AMA, 1983, p. 4). Regarding allocation of faculty salaries, dental hygiene standards listed several factors to consider and "research competencies" (Amer. Dent. Assoc., n.d., p. 27) were among them. Occupational therapy and dental hygiene standards mentioned research as an area for faculty development (Amer. Dent. Assoc., n.d.; AMA, 1983b).

Seven of the 18 sets of allied health standards or guidelines mentioned research activities in terms of developing student competencies. The physical therapist was to be able to "apply basic principles of the scientific

method, to read and interpret professional literature, participate in clinical research activities, and critically analyze new concepts and findings provided by others" (APTA, 1978, p. B-8). "The cytotechnologist will demonstrate ability to read and evaluate published professional literature . . . [and understand] principles of scientific research" (AMA, 1984, p. 2). Major curriculum divisions were labeled <u>research methods</u> and <u>statistics and research</u> for occupational therapy and medical record administration, respectively (AMA, 1981a, 1983b). Cardiovascular technology and nurse anesthesia standards mentioned research as a curricular elective.

The word research was not found in any context in the accreditation requirements for dietetics, histotechnology, medical technology, perfusion technology, physician assistant, respiratory therapy, and surgeon's assistant. Radiation therapy and radiography mentioned it once: Library holdings should be sufficient to promote "independent study and research" (AMA, 1981b, p. 6; 1983c, p. 5). Cardiovascular technology, nuclear medicine, nurse anesthesia, and sonography standards also mentioned research in the library context (AANA, 1980; AMA, 1980a, 1984, 1985b). Physical therapy and sonography guidelines mentioned research in the paragraphs concerning space needs (AMA, 1980a; APTA, 1978). Nursing and pharmacy standards frequently mentioned research. Nursing faculty members were to "pursue educational development, intellectual and

creative endeavors, . . . research, and scholarly activities" (NLN, 1980, p. 29). And pharmacy faculty members were to be evaluated for "scholarship demonstrated by productive research . . . and securing extramural funding in support of research" (ACPE, 1984, p. 7).

In summary, five sets of standards (cytotechnology, medical records administration, nuclear medicine, occupational therapy, and physical therapy) required the program graduates to understand, interpret, and/or assist with appropriate research. Two (cardiovascular technology and nurse anesthesia) suggested this as an innovative idea. Seven did not mention research or scholarship. Three used the words research or scholarship when describing space, library holdings, or student loans (radiography, radiation therapy, and sonography). Among the allied health standards dental hygiene, occupational therapy, and physical therapy standards stated that scholarship and research constituted bona fide faculty activities. Excluding these three, this is in marked contrast to nursing and pharmacy.

<u>The Biophysical Sciences</u>

The curricular divisions in the various sets of standards were itemized and discussed in several ways. This influences how the science requirements were discussed since they constituted only a part of each curriculum. Therefore the manner in which the curriculum requirements were explained will be described for each profession with emphasis on the sciences. This will be followed by a

discussion of cross-professional concerns. But first, what evidence is there that conceptual and integrative competence regarding the biophysical sciences were of concern to those who wrote the accreditation standards?

Concern for conceptual competence, as defined by Stark et al. (1986) in the sciences was apparent in the accreditation standards because all sets of standards had biophysical science requirements and several explained why. For physician assistants

> basic medical sciences are needed as a foundation for subsequent clinical studies [and it is] desirable . . . that this background include basic concepts in anatomy, physiology, pathophysiology, pharmacology, and clinical laboratory medicine in as much as the subsequent understanding of clinical medicine depends upon a knowledge of these content areas. (AMA, 1985c, p. 4)

"The structure of the professional curriculum in diagnostic sonography based upon a prerequisite foundation of postsecondary study in the biological sciences, introductory physics, and mathematics must include didactic content of appropriate scope and depth" (AMA, 1980a, p. 100).

Other statements infered a concern for integrative competence. Respiratory therapy students had to "understand the basic sciences and how basic principles relate to the clinical application of the specialty" (AMA, 1977b, pp. 9-10). "Students should acquire a clear understanding of the basic sciences and how basic scientific principles relate to clinical applications in the cardiovascular technology field" (AMA, 1985b, p. 4). "The [histotechnology]

curriculum must reflect the relationship between the content of the course of study and histotechnology functions, including principles and practice, application of basic sciences, . . . review of chemistry; laboratory mathematics; anatomy and tissue identification" (AMA, 1978, unpaged).

Biophysical Sciences in Each Curriculum

Cardiovascular technology standards divided the curriculum into basic, cardiovascular, and clinical units. Five components suggested for the basic unit were introduction, basic medical electronics, pharmacology, anatomy and physiology, and sciences. Pharmacology, anatomy, and physiology were to be concentrated on the cardiovascular system. The sciences were to include "biology, basic chemistry, physical principles of medicine, basic statistics, and general mathematics" (AMA, 1985b, p. 4). Curricular evidence for biophysical sciences was also found in the course examples listed under the clinical unit, i.e., cardiac and vascular pathology and physics.

Cytotechnology guidelines recommended 8 semester hours of chemistry and 20 semester hours of biological sciences as prerequisite to professional subjects. The biology courses could include "general biology, bacteriology, parasitology, cell biology, physiology, anatomy, zoology, histology, embryology, and genetics" (AMA, 1983a, p. 6). Professional course titles or subjects were not listed, but the standards described 18 competencies several of which implied a science background. "On detection of cellular manifestations of

disease, the cytotechnologist will be able to develop a differential diagnosis based on the cellular evidence in conjunction with pertinent cognitive knowledge and clinical data" (AMA, 1983a, p. 2).

Dental hygiene standards divided the curriculum into general education, basic sciences, dental sciences, dental hygiene sciences, and clinical practice. Several topics which did not need to be equivalent to individual courses but which had to be presented are listed under each division. Among these were general chemistry, anatomy, physiology, biochemistry, microbiology, pathology, nutrition, pharmacology, tooth morphology, head-neck-and-oral anatomy, oral embryology and histology, oral pathology, radiography, and periodontology and dental materials (Amer. Dent. Assoc., n.d.).

Required dietetics prerequisites were inorganic and organic chemistry, microbiology, human physiology, and an introductory nutrition course. Depending upon the specialty tract elected, biochemistry, biochemistry analysis, anatomy, advanced physiology, or genetics was required or recommended (ADA, 1976). Professional courses, topics, or competencies were not itemized.

Histotechnology standards listed topics which the curriculum must include. These included the "application of basic sciences, . . . review of chemistry, laboratory mathematics, anatomy and tissue identification" (AMA, 1978, unpaged).

Medical record administration guidelines divided the entire curriculum into general education, basic sciences, professional courses, and electives. A range of credit hours was suggested for each division; these were 16-24 semester hours for the basic sciences and 36-50 semester hours for the professional courses (AMA, 1981a). Fourteen content areas were specified for the professional courses, one of which was labeled sciences. Sciences were described as "anatomy and physiology (including a laboratory) ; the nature, cause, treatment, and management of pathologic, microbiologic, and clinical disease processes" (AMA, 1981a, p. 4).

Medical technology standards required 16 semester hours of chemistry and 16 semester hours of biological science plus one college level mathematics course. The professional curriculum has five divisions; principles of procedures and instruments, laboratory procedures in diagnosis and treatment, quality control, laboratory management and supervision, and methods of instruction (AMA, 1977a). Course titles and academic disciplines were not specified.

Nuclear medicine standards itemized required prerequisites which included postsecondary courses in "human anatomy and physiology, physics, mathematics, . . . and general chemistry" (AMA, 1984, p. 7). The professional curriculum was divided into seven areas: physical science; radiation biology, safety, and protection;

radiopharmaceuticals; in-vivo procedures; in-vitro procedures; administrative procedures; and therapeutic uses of radionuclides. Discussion of these competencies indicated a heavy emphasis on applied science and technology.

Nurse anesthesia standards required five college level biophysical science course prerequisites. Eighteen terminal competencies were listed and the curriculum was divided into academic and clinical parts. The academic component was subdivided into professional aspects; principles of practice; seminar; anatomy, physiology, and pathophysiology; chemistry and physics; and pharmacology. All of the sciences were specified to be "in relation to anesthesia" (AANA, 1980, p. 16) and a minimum number of clock hours was required for each academic component.

Nursing standards did not itemize courses, content, or subjects. However, several standards addressed the curriculum and many guidelines imply the importance of science. The curriculum was "supported by other sciences or the content reflects the interactive nature of nursing science with medical sciences, behavioral, physical, and natural sciences" (NLN, 1980, p. 41).

Occupational therapy standards divided the curriculum into liberal arts, sciences, and humanities; biological, behavioral, and health sciences; occupational therapy theory and practice; research; values and attitudes; and fieldwork. A health science guideline was that "content should include

anatomy, kinesiology, physiology, neuroanatomy, and neurophysiology" (AMA, 1983b, p. 2).

For the perfusionist "the curriculum must include or have as prerequisites appropriate background courses including anatomy and pathology, physiology, chemistry, and pharmacology" (AMA, 1980b, p. 2). Several physiological concepts and technical procedures such as hypothermia, heart lung bypass, and blood gas analysis were listed. And "the curriculum must include course work covering the major clinical applications of" (AMA, 1980b, p. 2) these technologies.

Pharmacy standards divided the curriculum into general education, basic sciences, professional sciences, and practical experiences. Essentially the basic sciences were prerequisites. The professional sciences were subdivided into three areas: "biomedical sciences; . . . [which] include anatomy, physiology, microbiology/immunology, biochemistry, pathology . . . [and] pharmaceutical sciences; . . . [which] include medicinal chemistry . . . basic pharmaceutics, biopharmaceutics, pharmacokinetics, pharmacognosy . . . ; and pharmacology" (ACPE, 1984, p. 17). The clinical sciences "include clinical applications based on the biomedical and pharmaceutical sciences such as . . . disease processes, clinical pharmacology, and therapeutics" (p. 17).

Physical therapy standards did not specify prerequisite or professional courses. They did require a curriculum plan

and listed several competencies that the entry level clinician would have. Several of these competencies implied a background in the sciences. A practitioner had to be able to perform "definitive physical therapy testing of the following systems: neurological, muscular, skeletal, cardiovascular, pulmonary, integumentary, [and] metabolic" (APTA, 1978, p. B-5).

Physician assistant curricular requirements had four content areas; basic medical sciences, patient assessment, instruction and clinical practice in relevant clinical disciplines, and professional role. The guidelines stated the importance of the sciences and suggested anatomy, physiology, pathophysiology, pharmacology, and clinical laboratory medicine (AMA, 1985c).

Radiation therapy technology standards required students to have a background in high school science and mathematics (AMA, 1981b). Fourteen topics which had to be in the curriculum were listed and among them were "human structure and function; oncologic pathology; radiation pathology; radiobiology; mathematics and radiation physics" (p. 2).

Radiographer standards listed 17 content areas. Some of these were introduction to radiography, human structure and function, radiation physics, principles of radiation protection, principles of radiation biology, and radiographic pathology (AMA, 1983c).

Sixty-two semester hours in the professional program were required by respiratory therapy standards. Required topics were listed under basic or respiratory therapy units of instruction. Examples of the former were "general science to include biology, chemistry, physics, and mathematics; general anatomy and physiology; cardio-pulmonary-renal anatomy and physiology; microbiology, pharmacology [and] clinical topics" (AMA, 1977b, p. 9).

Sonography guidelines recommended "human anatomy and physiology, mathematics, and physics" (AMA, 1980a, p.101), as prerequisites. The professional curriculum was divided into seven units some of which were physics, biological effects of ultrasound, applied biological sciences, and clinical medicine. Additional units were enumerated for the echocardiography subspeciality. The applied science and technical nature of the curriculum was apparent from the unit subheadings. For example, physics was to include "fundamental physics and mathematics, acoustical physics, [and] physical principles of ultrasound" (p. 102).

Surgeon's assistant standards recommended two years of college prior to admission, but course work was not specified. The professional curriculum was divided into 13 areas, some of which were human anatomy, including neuroanatomy; medical physiology; fundamentals of clinical medicine, including pathophysiology; and pharmacokinetics and pharmacodynamics (AMA, 1982).

Similarities Among Biophysical Science Standards

From this review of accreditation curriculum requirements it was obvious that a variety of biophysical sciences constitute required course content for the 20 health professions programs. Summarized in Table 6 is the scope and diversity of these sciences. Under each primary science discipline the adjectives or subdisciplines used by one or several sets of standards is listed. However neither this table nor the review necessarily indicate depth or duration of the science course requirements. But the guidelines give several clues.

Standards which applied only to the baccalaureate programs in nursing, dietetics, and pharmacy (see Table 1) can be assumed to refer to undergraduate college level science courses. A comparable or more advanced level of course work can probably be assumed for standards which restrict the credential to be awarded to baccalaureate, post baccalaureate certificate, or masters degrees, as with medical record administration, occupational therapy, physical therapy, and medical technology. Of these, all but the latter limited sponsorship to 4-year colleges or universities.

Cytotechnology, nurse anesthesia, physician assistant, and surgeon's assistant standards all appeared to

Table 6

<u>Sciences Named in Accreditation Standards</u>

Anatomy
- cross sectional
- embryology
- general
- human
- neuro
- oral embryology

- Anatomy & Physiology
- human structure & function
- cardio-pulmonary-renal
- circulatory
- general
- human

Basic Sciences
- academic
- general
- natural
- physical

Biology
- radiation
- zoology

Chemistry
- basic
- biochemistry
- biochemistry analysis
- general
- inorganic
- medicinal
- organic
- radiation

Microbiology Molecular Sc.
- bacteriology
- parasitology

Nutrition
- advanced
- human

Pathology
- anatomical
- clinical disease/disease
- histopathology
- oncological
- oral
- pathophysiology
- radiation

Pharmacology
- pharmaceutics
- pharmacodynamics
- pharmacokinetics
- radio

Physics
- nuclear medicine
- radiation

Physiology
- advanced
- human
- medical
- neuro

Subcellular/cellular
- cell biology
- genetics
- histology
- immunology
- oral histology

Other
- kinesiology
- periodontology

build their professional curricula on at least a prerequisite of 2 years of college. Surgeon's assistant "candidates for admission should have completed two years of college" (AMA, 1982, p. 3). On admission, cytotechnology students "shall have acquired an academic background at the college level including basic chemistry and biology courses beyond the introductory level" (AMA, 1983, p. 6). For physician assistant "the manner in which programs ensure that students have sufficient background in the basic medical sciences may vary" (AMA, 1985, p. 4), but it must be accomplished before or during the professional curriculum. Nurse anesthesia standards required candidates for admission to be registered nurses and to have had "a minimum of 30 semester hours" (AANA, 1980, p. 8) including five biophysical science courses.

Accredited programs among this group offered certificates through masters degrees. Evidence for considerable depth in some of the sciences was apparent. For surgeon's assistant "neuroanatomy at an advanced level with lectures, dissections, demonstrations, and prosections" (AMA, 1982, p. 2) was stipulated. After having taken 32 semester hours of biological sciences and chemistry the cytotechnology student should study pathology and cytopathologic diagnosis (AMA, 1983a). "Advanced" (AANA, 1980, p. 36) textbooks were specified for physiology, pathology, and pharmacology for nurse anesthesia students.

Nuclear medicine and sonography required candidates for admission to have completed high school level physics, biology, algebra, and geometry (AMA, 1980a, 1984). These and the perfusionist standards appeared to build the curricula on a strong high school science base. However, all three required additional postsecondary work in the biophysical sciences. The guidelines implied detail if not depth in areas germane to the occupations. Nuclear medicine students should study "biochemical and physiological properties of radiopharmaceuticals" (AMA, 1984, p. 6). For sonography students, pathophysiology should include "congenital and acquired cardiac diseases [and] alterations in hemodynamics" (AMA, 1980a, p. 102).

Although accredited baccalaureate programs existed in all of the remaining fields, the majority of histotechnology, radiation therapy technology, and radiography were certificate programs and most dental hygiene and respiratory therapy programs were associate degree programs (AMA, 1985a). Cardiovascular technology was a new field and no programs had completed the accreditation process to date at the time of the review.

The use of the academic credential to be awarded as an index of the depth of biophysical science course content can be misleading. An example of an apparent dichotomy between accreditation requirements or expectations and the academic credential is illustrated by respiratory therapy guidelines.

> The base of all courses must be broad and the content must review the respective areas in their entirety well beyond the specific and particular requirements of clinical respiratory therapy. The students must understand the basic sciences and how basic principles relate to the clinical applications of the specialty. A general overview of mathematical principles, biological sciences, pathology, microbiology, clinical medicine, and therapeutics must be accompanied by special, in depth study of cardiopulmonary and renal anatomy, pathology, clinical management and therapeutics. In these areas the level of instruction must be similar to those ordinarily provided to medical students. (AMA, 1977b, pp. 9-10)

Concerning respiratory therapy faculty, "requirements of a health related program frequently can not be met by faculty of the average educational institution. Properly qualified instructors in such fields as pharmacology and microbiology are rarely found on the faculty of two-year institutions" (AMA, 1977b, p. 6). With this, the guidelines suggested the utilization of hospital personnel as teachers. Recall that the standards for this occupation required educational institution sponsorship and most programs were in community colleges and an associate degree was awarded (AMA, 1985a).

College-wide Accreditation

"Accreditation is a system for recognizing educational institutions and professional programs affiliated with those institutions for a level of performance, integrity, and quality which entitles them to the confidence of the educational community and the public they serve" (Harris, 1987, p. 444). Both professional and academic leaders are nearly unanimous in their support of the concept of

accreditation (Amer. Dent. Assoc., n.d.; Council on Postsecondary Accreditation, 1986; Ford & Cicarelli, 1982; NLN, 1979; Southern Association of Allied Health Deans in Academic Health Centers, 1985). Aside from this support in principle, major concerns have been voiced regarding the relationship of accreditation to federal and state government (Dickey & Miller, 1972; Nyquist, 1980; Orlans, 1980; Tucker & Mautz, 1978), expense, proliferation of agencies, duplication of processes, and parochial requirements (Doerr, 1983; Elsass & Pigge, 1980). Improvement was being urged by many (Clemow, 1985-1986; Council on Postsecondary Accreditation, 1986; Semrow, 1982).

Criticism concerning expense, duplication, inflexibility, and professional control associated with specialized accreditation abounded among administrators concerned with allied health (Ford, 1983; Freeland, 1986; R. B. Mautz, 1987, personal communication). This was even evident in some college catalogs. "Accreditation requirements for the individual programs preclude the establishment of general school admission prerequisites, registration dates, and course and degree requirements" (Virginia Commonwealth University, 1984, p. 104). The call for alternatives and experimentation was acute (Florida Postsecondary Planning Commission, 1985; NCAHE, 1980).

One response to this dissatisfaction has been the development of school-wide "Standards for the Accreditation of Academic Units (Colleges, Schools, Divisions) of Allied

Health Professions" by the Southern Association of Allied Health Deans at Academic Health Centers (1985). While this alternative was still in the developmental phase at the time of the study, the standards had been written and mock self-studies and site visits have been conducted in conjunction with actual CAHEA visits. A primary objective of this accreditation project was to present a valid alternative to "the present process of programatic accreditation as a means of quality assurance in allied health education" (Vaught, 1986, p. 38-39). How do these standards compare with the 20 specialized sets just reviewed?

Autonomy of the college was a major issue, as was evident under many sections. "The administrative structure of the unit . . . shall be consistent with the structure for other units . . . [and] programs within the unit and their directors should report administratively to the chief administrative officer of the unit" (Southern Association of Allied Health Deans at Academic Health Centers, 1985, pp. 7 and 6). The authority to initiate or eliminate "programs shall rest with the governing structure of the institution, but the specific authority for conducting programs shall be the responsibility of the administration and the faculty" (p. 7). "The institution and the unit must maintain control of its policies relative to research and instruction" (p. 16). Also, "for programs that receive a substantial portion of their funding from sources external to the unit, the stability of this income must be evidenced" (p. 10).

In contrast to the other sets of standards including those for pharmacy and nursing, which in AHCs were usually applied college-wide, the standards relating to administrator qualifications, competencies, and evaluation were absent. But qualifications, expectations, and evaluation of teaching faculty were specified. They "must have demonstrated competence in the fields in which they teach. [And] . . . there must be evidence that this competence is maintained" (p. 11). The college "should have established criteria against which performance of individual faculty are evaluated. These criteria should be known by all concerned" (p. 11). There was no itemization of requisite academic or professional credentials.

Two faculty roles were emphasized, undergraduate teaching and professional service. College-wide commitment to undergraduate education was evident because "graduate work should not be undertaken unless the academic integrity of the undergraduate program can be maintained" (pp. 14-15). An obligation to the local and professional communities was suggested by encouragement to "conduct many different forms of special activities . . . off campus classes, independent study programs, conferences, and workshops" (p. 14). Faculty service to the university or AHC was not mentioned. Professional practice was implied by the requirement for faculty to remain skilled for teaching purposes and a request that any faculty clinical practice plan be included as an appendix.

Regarding faculty administrative activities, it was stipulated that faculty should participate "in the development of academic policies . . . [and] appropriate members of the faculty" (p. 10) could participate in budget preparation. Likewise there was no mandate for research, but "the role of faculty scholarly activity and research within the unit and the role of faculty in conducting such activity should be addressed" (p. 15).

Professional practice in service of the teaching mission was stressed. Service to the local professional communities was emphasized but not to the AHC or university. Decision-making about academic policy and research, if espoused by the college, was mentioned. Lastly, the standard concerning educational programs stated that "programs must demonstrate that an effective relationship exists between the program content and the current standard of practice in each field where a program exists" (p. 9).

As explicit as this and other standards were, they were still open to different interpretations. The above mandate could imply the values which the authors placed on current practice, that is, not lagging behind. It could also be interpreted to retard innovation, prevent expansion of scope of practice, or obstruct the need or wish to raise professional entry levels. In other words, if clinicians are not presently engaging in a given role, the course content prerequisite to a new or expanded role can not be justified. The recommendation that there be a "balance in

the overall educational offerings with determined limitations on the number of hours allowed in specialized areas" (p. 8) "begged" explanation. Was the underlying premise concern for general education, a belief that specialization is not feasible at the undergraduate level, a method to facilitate interdisciplinary and core courses, or something else?

In one standard there was a requirement for program specific evidence for the teaching learning process. Courses should have been evaluated, objectives should have been written, the curriculum should have been under continuous study at the program, unit, institutional, and state levels. In marked contrast with all other sets of standards examined, curriculum content was not addressed. "The major responsibility for the curriculum and related learning experiences" (p. 9) should have been vested in the "unit administration and faculty" (p. 9). There was no mention of medical directors or advisory committees. Physician role, if any, in the curricula was not mentioned. But a request for center-wide data to be included as an appendix did imply physician participation. The request was for medical school faculty role, strengths, weakness, and budgetary support to be explained. Thus, according to this standard, curricular content responsibility appeared delegated to the college.

In summary the proposed standards were developed in response to CAH administrator dissatisfaction with program

specific accreditation. The standards addressed 11 major areas, which had the same topic headings as the Southern Association of Colleges and School's (1975) accreditation standards. Documentation of curriculum processes and outcomes was required but there were no specifications and only a few generalities regarding content. Sciences, like other course topics were not mentioned. University/AHC concerns were addressed and this was especially evident by requests for information to be included in appendices rather than by required standards. The salient theme of the entire document was administrative, not curricular or professional.

This concludes the review of 21 sets of accreditation standards. Detail and diversity characterized the stipulations of the standards. Faculty were expected to teach, but curricula development and responsibility were sometimes vested in program administrators, advisory committees, or physicians. Among the 20, science topics were always mentioned, frequently in precise but nonacademic language. Excluding clinical practice, faculty service and research responsibilities were infrequently mentioned. Clearly, the accreditation standards examined did not provide a basis upon which leaders of AHC based CHAs could evaluate the delivery system for the biophysical science curricular components for all programs.

College of Allied Health Catalogs

Introduction

Letters requesting a catalog describing undergraduate allied health programs were mailed to the office of the registrar of 60 institutions. All institutions were listed in the 1985 or 1986 directories of the Association of Academic Health Centers and allied health was indicated as one of the institutional components. Eight weeks later, after a 63% return, one follow-up request was mailed to the respective deans (see Appendix B). All correspondence received (catalogs, pamphlets, and letters) was reviewed for the purpose of identifying mission statements and goals, faculty role regarding service and research, evidence of science course delivery systems, and selected items mentioned in specialized accreditation standards.

Responses were received from 51 (85%) institutions. Some characteristics of all of the colleges are summarized in Table 7. Most were public and part of a major university or university system but some were private, church affiliated, or free standing academic health centers. The allied health units represented independent, dependent, and coordinated structures. A few had no generic baccalaureate programs, or their institutions just served as a clinical practice affiliate for other institutions; but most had several baccalaureate programs.

While it was not the intent to compare catalogs with accreditation documents, both were reviewed for some of the

Table 7

Characteristics of AAHC Members which Listed Allied Health as a Component

Population	60
Member of American Society of Allied Health Professions	40
Institutions which Responded	51
Allied Health Unit Sponsors Baccalaureate Programs[a]	44
Allied Health Organization Structure	
Independent	33
Dependent	8
Co-ordinated	5
Unable to Determine	14
Carnegie Classification of University[b]	
Research I	17
Research II	5
Doctoral I	2
Doctoral II	3
Health Center	29
Comprehensive I	4

Note. Includes all institutions listed in 1985 and 1986 AAHC directories.

[a] Includes only the institutions that responded to a catalog request.

[b] From "Carnegie Foundation's Classification of More than 3,300 Institutions of Higher Education" (1987) The Chronicle of Higher Education July 8, pp. 22-26, 28-30.

same information; therefore, some comparisons of content were made. The purposes of the two types of documents are different. Catalogs serve to describe the institution and its programs to the public, especially potential and enrolled students. The content often conveys a positive image of the institution as well as facts. Accreditation documents, while available to the public, are generally read by those faculty and administrators whose programs are to be evaluated. The information is presented in a more direct and proscriptive manner. But items of content were either present or not in both sets of copy.

Mission Goals and Purposes

Of the brochures and catalogs received, all except one directly or indirectly stated the institution/college mission or general purposes. "The University of Texas Health Science Center at San Antonio is . . . dedicated to research, patient care, and education" (1986, p. 2). "The State University [of New York] motto is 'To Learn--To Search--To Serve'" (SUNY Health Science Center at Brooklyn, n.d., p. 48). The purpose of the University of Wisconsin-Madison (1985), "is to provide an environment in which faculty and students can discover, examine critically, preserve, and transmit the knowledge, wisdom, and values that will help ensure the survival of the present and future generations" (p. 2). The Louisiana State University (1986) "mission involves development of the highest levels of intellectual and professional endeavor in programs of

instruction, research, and service . . . [it] serves the people as an instrument for discovery as well as transmission of knowledge" (pp. 6-7). Clearly the traditional teaching, research, and service triad is evident in the mission statements.

Statements of purpose and goals of the colleges were more specific. Objectives of the Louisiana State University School of Allied Health Professions were "to increase the supply . . . of patient oriented health professionals . . . to meet the need for health services and future teachers in health educational programs . . . to develop and maintain programs of investigative studies and research" (Louisiana State University, 1986, pp. 65-66). In some brochures the goals were not clearly stated but the essence of the colleges' philosophies could be inferred. Through a series of photographs and multiple sizes and forms of print the prospective student of the College of Health Related Professions of the State University of New York Health Science Center at Syracuse [SUNY-Syracuse] was told that "we prepare you for a career . . . place you at the cutting edge . . . let you practice what you learn . . . we care, we share . . .we teach by example . . . and when you leave we're still just a telephone call away" (State University of New York Health Science Center at Syracuse, n.d., pp. 3-9). In some catalogs the purposes of each department were further elaborated. Faculty of one department at the Virginia Commonwealth University (1984) was "concerned with

improving the quality of occupational therapy. . . . Research, community service, and continuing education are viewed as ways to improve professional services" (p. 116).

A sense of pride and commitment associated with an institution's history, mission, or service to a particular locale or population was apparent in numerous bulletins. One institution exemplifying this was Howard University. It was established "to help uplift the nations newly emancipated slaves . . . [a founder] fervently believed that former slaves could be educated" (Howard University, n.d., p. 9). "Howard is located on a hilltop overlooking the nations capitol . . . [but it] sees itself not at the center of a nation, but at the center of a world" (n.d., p. 5). The State University of New York Health Science Center at Brooklyn (n.d.) had "programs for the educationally and economically disadvantaged [which] have become models" (p. 48). George Washington University (n.d.) offered highly specialized programs for military personnel such as nuclear undersea medical technology (p. 78). The catalog authors boasted that through its affiliates, Louisiana State University (1986) provided health care for 75% of the states indigents.

The complexity attributed to CAHs (Wise, 1979) was evident in some publications. Most programs offered by the School of Health Related Professions of the University of Medicine and Dentistry of New Jersey (n.d.) were cosponsored with other institutions. The Texas Tech School of Allied

Health Bulletin (Texas Tech University Health Sciences Center, 1984) displayed not only the university calendar but a calendar for each allied health program. The Undergraduate Health Sciences Bulletin of the University of Minnesota (University of Minnesota, 1985) described allied health programs offered by its schools/colleges of agriculture, home economics, liberal arts, medicine, and others. Among the catalogs reviewed, the baccalaureate programs offered included occupational safety and health (Arizona), speech language and auditory pathology (East Carolina), toxicology (Medicine and Dentistry of New Jersey), mortuary science (Minnesota), medical illustration (Ohio State), in addition to the 18 professions described in the accreditation overview. Also, among the colleges the whole range in academic level, certificate through doctorate, was represented.

Pride in participation with the allied health movement and its antecedents was apparent. The origin of Boston University Sargent College of Allied Health Professions was traced to the inception of the Sargent Normal School of Physical Training in 1881, a predecessor for "modern rehabilitation and preventive health care" (Boston University, 1986, p. 1) education. The Division of Allied Health Sciences of Indiana University "was one of 13 allied health units from across the country to participate in planning and formation of the . . . American Society of Allied Health Professions" (Indiana University, 1985, p. 5).

The stance of a professional school was apparent in the many references to service and continuing education. "The professional service mission of the College includes the offering of continuing education courses to practitioners to enhance teaching, administration, and professional skills" (University of Arkansas for Medical Sciences, n.d., p.1). And a purpose of the University of Nebraska was "to provide selected continuing education programs for practicing allied health professionals" (University of Nebraska Medical Center, 1985, p. 8).

A commitment to professional service by the faculty was suggested for the Mayo School of Health-Related Sciences where the "emphasis [is] on what is best for the patient" (Mayo Foundation, n.d., p. 8). But faculty service responsibility was not limited to professional practice. Another catalog stated that the School of Community and Allied Health of the University of Alabama at Birmingham encourages consultation and promotes "faculty participation in organizations and committees of the School and University" (University of Alabama at Birmingham, 1985, p. 4). The allied health faculty at the University of Nebraska "provide consultant services and leadership [for] groups and organizations . . . [and] provide services as appropriate to patients and to the public" (1985, p. 8).

Integrating clinical service and research was Sargent College of Boston University. "It is the first and only school of allied health to offer bachelor's, master's, and

doctoral degrees in all of its departments" (Boston University, 1986, p. 1). The college faculty conducts four health care clinics which serve clients, students, and faculty for service, teaching, and research purposes. The faculty members of the College of Allied Health Professions at the University of Kentucky were "committed to the ideals of excellence in scholarship in both classroom and clinical settings" (University of Kentucky, 1985, p. 3). Ample evidence that faculty aspire to excel rather than simply maintain technical skills or communicate facts was found in the Medical University of South Carolina (n.d.) catalog. "Investigative research in the health related professions including the areas of new clinical skills, educational methodology, and health care delivery" (p. 98) were among college goals. Also, "the faculty and (to whatever extent possible) students should contribute to the discovery, dissemination, and utilization of knowledge through research and publication, and in exemplary practice" (University of Illinois at Chicago, n.d., p. 9).

All catalogs and brochures described the programs and often respective courses. The colleges' of allied health educational missions as fulfilled by teaching can be summarized as "recruiting and retaining highly qualified faculty" (University of Alabama at Birmingham, 1985, p. 3) all of whom become "actively engaged in teaching with opportunities in research and clinical practice" (Medical College of Ohio, n.d., p. 5), and several of whom are "at

the forefront of their disciplines in instruction and research" (University of Kentucky, 1985, p. 3). Clearly the catalogs indicated that the goals of the CAHs were congruent with and reinforced the teaching, research, and service missions of their universities.

The Sciences

Several baccalaureate allied health curricula described in the catalogs consisted of 2 years of preprofessional course work followed by 2 years of professional phase courses, the 2-plus-2 design. Other patterns, such as 3 years of prerequisite course work followed by a 1 year professional phase, the 3-plus-1 design, were also encountered. The latter was common with the clinical laboratory science programs. For some curricula, the catalogs described general education, supporting sciences, and professional courses sequenced over the entire 4-year period, the integrated curriculum. Whatever the design, the traditional 4-year academic calendar can not be assumed. Countless programs included summer terms, and/or exceeded 4 years, and/or terminated after an extended period of intensive clinical experience.

Whatever the allied health program, curricular design, or university, all catalogs specified prerequisite biophysical sciences. Evidence that allied health faculties expected the biophysical sciences to serve as a foundation for further study and not merely general education was apparent. In reference to high school preparation, the

University of Connecticut School of Allied Health faculty recommended that students wishing freshman admission to any of the five baccalaureate allied health programs "have physics, chemistry, biology, and four years of math" (University of Connecticut, 1986, p. 7). The catalog for the School of Allied Health Professions at the University of Wisconsin-Madison stated that the faculty provided "professional education in health professions based upon a broad and firm foundation in the liberal arts and sciences . . . [and instill] attitudes of scientific inquiry and critical thought" (University of Wisconsin-Madison, 1985, p. 3). In enumerating lower division sciences many catalogs mentioned laboratory requirements for chemistry, physics, microbiology, and physiology.

For specific programs, the importance of the biophysical sciences was commonly rephrased. "Knowledge and skills of a dental hygienist are indepth and highly scientific and include such areas as anatomy and physiology, histology, pharmacology, microbiology, pathology, nutrition, and radiology" (Medical University of South Carolina, n.d., p. 121). Cardiopulmonary science majors graduate "with a firm background in anatomy and physiology, biochemistry, pharmacology, and clinical medicine" (Louisiana State University, 1986, p. 73). Nuclear medicine technologists need a "thorough knowledge . . . regarding radiation and its physical as well as biological effects" (University of Arkansas for Medical Sciences, n.d., p. 56). "The strengths

of the [occupational therapy] program lie in a strong background of the basic human sciences. . . . During the junior year students study basic sciences (anatomy, neuroanatomy, physiology, kinesiology)" (SUNY Health Sciences Center at Brooklyn, n.d., p. 23). And for physical therapy "the basic science courses, fundamental to understanding the theory of the clinical sciences, are offered early in the program and include graduate courses of the college of medicine curriculum" (University of Nebraska Medical Center, 1985, p. 46).

Science Course Delivery System

The description of a university organizational structure is a tangent function of a catalog. Thus they can not be relied upon to identify basic science department structure or the system in place for course delivery. However by scrutinizing the narratives, course prefixes, and accompanying explanations (when provided) it is possible to discern patterns which may indicate where some of the teaching and/or administrative responsibilities for science course delivery rest.

The delivery system for the professional phase science courses as reflected by the catalogs included at lease six structures: (a) departments in the colleges of medicine (Emory); (b) departments within the colleges of allied health (Boston University); (c) departments that serve all health center schools but are not administered by any one of them (Virginia Commonwealth University); (d) liberal arts

and science departments of the university (University of Arizona); (e) departments in other colleges of the health center, namely dentistry (Medical College of Georgia) or pharmacy (Wayne State University); (f) interdisciplinary units of the colleges of allied health (University of Texas-Galveston); and possibly, (g) program specific faculty for all basic, applied, and clinical sciences in a given curriculum.

The first four delivery systems are consistent with the basic science organizational structures reported by the vice presidents in the AHC governance study (AAHC, 1980b). When asked, "How is basic science education organized [in your AHC]?" (p. 330), all 86 respondents identified one of the four preselected choices, i.e., "within each school, medical school departments teach students from other schools, health center-wide, [or] university-wide" (p. 330). Some of these and other patterns reflected by the catalogs warrant discussion.

In many programs all or almost all professional phase courses carried the same letter prefix. This was found for programs at the Universities of Alabama, Arkansas, and Texas Tech. At the Universities of Connecticut and Louisville all professional phase nonscience courses carried program/department specific or CAH prefixes. Most of the science courses had CAH-wide letters in the prefixes. These courses were referred to as Allied Health: Health Sciences (University of Connecticut) or Basic Science Core

(University of Louisville). But it can not be assumed that the allied health departments or colleges actually provided the space, laboratories, or faculty.

A direct statement that a college does assume responsibility for a portion of the science course delivery was in the college catalog for Boston University (1986). A department in that college "offers intermediate and advanced courses in human anatomy, neuroanatomy, human physiology, and nutrition for the various health programs" (p. 15). However not all program required biophysical sciences were offered by this department. "The following courses administered by other Boston University schools and colleges are an integral part of degree programs at Sargent College" (p. 70). The courses listed included upper and lower division sciences delivered by the colleges of liberal arts, dentistry, and medicine. This catalog left no question about which college or department faculty was responsible for any course.

In some catalogs, participation by the faculty of the colleges of medicine was stated. At Emory some basic science "courses are taught for the Allied Health programs by the Basic Science Departments of the Medical School" (Emory, 1986, p. 31). At George Washington University "the School of Medicine and Health Sciences serves other divisions of the University by making available to nonmedical students certain undergraduate and graduate courses in the following departments; anatomy, biochemistry,

microbiology, pathology, pharmacology, and physiology" (George Washington University, 1986, p. 83). At the University of Nebraska, course prefixes implied that some sciences may be taught by college of medicine faculty for four programs. But this was only verifiable for the physical therapy curriculum where "the basic science courses include graduate courses of the College of Medicine curriculum" (University of Nebraska Medical Center, 1985, p. 46).

At the Health Science Center at Brooklyn, many science courses "designed specifically for undergraduate students are presented by the faculty of various basic science departments of the Medical Center" (State University of New York Health Science Center at Brooklyn, p. 46). It was unclear if these departments were administered center-wide or by the medical school. The center-wide system was described in one catalog, for Virginia Commonwealth University. A synopsis and some assumptions about this delivery system are pertinent.

> Basic sciences historically have been an integral part of the curriculum of medicine, dentistry, pharmacy, nursing, and allied health fields. In the earlier years of this university, the basic science departments were administered by the School of Medicine. . . . In 1966, by action of the Board of Visitors, a separate School of Basic Sciences and Graduate Studies was established. In 1974 . . . it became the School of Basic Sciences.
>
> All departments in the School of Basic Sciences provide instruction in their disciplines for students in the other schools. By developing large, strong departments with a good balance of faculty, postdoctoral fellows, and graduate

> assistants, it is possible to provide quality instruction for all the health professions schools, and to maintain strong research . . . programs. (Virginia Commonwealth University, 1984, p. 85)

Another scheme evident and sometimes explained was the use of an interdisciplinary approach to deliver some of the program required sciences. The University of Mississippi School of Health Related Professions had a unit called Interdisciplinary and Cooperative Education (University of Mississippi at the Medical Center, n.d.). Under this catalog heading nine faculty were listed and eight courses were described. All courses carried an "ID" prefix, unique to this unit. Because of the pattern followed in describing the professional departments and curricula, the implication was that the faculty listed for this unit taught the eight "ID" courses, three of which were biophysical sciences. Some of these faculty and all of those which appeared to have graduate degrees in a biophysical science held primary appointments in the College of Medicine.

Another interdisciplinary mode was described for the University of Texas School of Allied Health Sciences at Galveston. The catalog supplement and enclosed form letter described the core curriculum, "the implementation of [which] embraces the philosophy that there are generic competencies, (knowledge, attitudes, and skills) that are considered essential to the preparation of all allied health practitioners" (University of Texas Medical Branch at Galveston, 1985 Catalog Supplement, form letter, n.d.). Six

courses constitute the core, two of were in biophysical sciences, anatomy and physiology, and pathology. All 6 of these courses were part of four of the seven baccalaureate curricula offered. The anatomy and physiology core course was not a component of occupational therapy, physical therapy, or physician assistant curricula.

Perusal of several catalogs indicated that the science courses for any one program may have been provided with a combination of administrative arrangements. For example, the cytotechnology curriculum of the Medical University of South Carolina included human anatomy, histology, and basic sciences for cytotechnology. The former course was described under the Department of Anatomy and Cell Biology, and the latter under the cytotechnology/histotechnology program courses which were part of the School of Applied Laboratory Sciences in the College of Health Related Professions. The histology course was not described and carried an atypical prefix so it may have been offered by a third unit (Medical University of South Carolina, n.d.). The dental hygiene curriculum of the University of Mississippi included dental anatomy described with other program courses, biochemistry listed with college of medicine biochemistry courses, and pathology listed under the interdisciplinary unit for the college (University of Mississippi at the Medical Center, n.d.).

When the catalog information concerning the biophysical sciences was appraised collectively, countless seemingly

trivial statements or omissions could be interpreted as important nuances. Seldom were the basic, applied, or professional science course structural arrangements elucidated; with Boston and Virginia Commonwealth universities as notable exceptions. The presence of interdisciplinary units and core courses were often explained with pride. But in several instances the profession, discipline, and university status of the responsible faculty for the science courses was confusing or not discernable. Lastly, if and when the medical schools' faculties provided biophysical science courses for undergraduate allied health students or permitted them to enroll in medical curriculum courses it was not a presumed right. As the writers of one catalog explained, an advantage of enrolling in the Health Science Center at Buffalo "is the privilege of taking basic science courses from faculty of the medical school who have national reputations" (State University of New York at Buffalo, n.d., p. 18).

In summary, the catalog review revealed that the biophysical sciences were perceived as important and were a component of the heterogeneous allied health curricula. The delivery of these courses was accomplished through colleges and departments for which allied health faculty and administration may or may not have had responsibility or authority. The apparent disparity between the neat categorization of the basic science organizational structure

by the vice presidents (AAHC, 1980b) and the assortment reflected by the catalogs may not be contradictory. The vice presidents responded to a question about department structure. "How is basic science education organized?" (AAHC, 1980b, p. 330). They were not asked which departments provided biophysical science instruction for baccalaureate level allied health students. Perhaps the vice presidents, like the authors of the documents reviewed for the governance study "tended to view the academic health center in terms of its medical school" (AAHC, 1980d, p. 4).

Science Related Courses

The operational definition of a science related course consists of three components. First, a science related course is one required during the professional phase of an allied health baccalaureate program. This excludes prerequisite and elective courses. The level of the courses may be lower division, upper division, or graduate.

Second, the course content must concern the biological or physical sciences. Separate courses in mathematics, statistics, and medical terminology, are excluded as are social sciences, clinical practicum, and courses concerned with the theory or applications unique to the various professions. Both general introductory and advanced or specialized biophysical sciences are included. Typically for health professions students these courses were chemistry, physics, anatomy, physiology, microbiology,

pharmacology, pathology, and nutrition, plus the divisions among these disciplines (see Table 6)

Lastly, the science courses for this study were identified by the use of Stark's framework (Stark et al., 1986). The published course description had as a primary purpose the promotion of conceptual competence, in the opinion of experts.

Although allied health occupations "differ with respect to the scientific foundations of their knowledge base" (NCAHE, 1980, p. 66), science courses constituted an important curricular segment for most. The accreditation and catalog reviews established this fact. Concern for a theoretical mastery (conceptual competence) of professionally relevant science was evident in a broad array of literature. Medical technology "faculty feel that a major strength of the program is the basic science preparation provided its students" (Florida Board of Regents, 1983, p. 52). Dietitians are committed to "advancing the science of nutrition" (Hart, 1979, p. 127), they contribute "special knowledge of biochemistry, physiology, nutrition, and drug interaction with nutrients" (p. 127). "Occupational therapy student[s] need [to] study pathology . . . as a means to understanding occupational dysfunction" (Johnson, 1974, p. 212). "To understand and use the apparatus and techniques of anaesthesia, anaesthetists require a knowledge of basic physics" (Duffin, 1976, p. vii).

"How much [science background] to acquire and to what depth are as yet unanswered questions" (Duffin, 1976, p. vii). As health professions have developed and matured a common theme has been the advocacy of formal education and more science prerequisite to and during the curricula. This has occurred in medicine, dentistry, nursing, and pharmacy (Flexner, 1910; Gies, 1926; Goldmark, 1923; Mrtek, 1976). These same trends were apparent within the allied health professions.

Hart (1979) quoted from the 1972 Millis commission on dietetics "the amount and quality of nutrition science learning seem inadequate to form a firm base for the practice of a health service which needs to be clearly professional in it's competence" (p. 118). Collier and Youtsey (1979) wrote that respiratory therapy professional content is "based on a core knowledge in . . . chemistry, physics, basic anatomy, and physiology" (p. 110). In a historical review of radiological technologies curricula, Soule (1974) traced the education from on-the-job training to "three years (90 semester hours) of acceptable college credit and [a] major in the biological or physical sciences" (p. 155). Rhoton and Gravenstein (1977) justified the implementation of an undergraduate anesthesia program in a university setting, "because of the need for students to understand and manipulate concepts rather than simply to perform technical tasks in routine settings" (p. 10). Some contend that "people who act as leaders in health must have

a strong background in basic science" (NCAHE, 1980, p 7).

The authors cited above all directed their remarks to specific health professions. For the allied health professions collectively, the literature on biophysical sciences was sparse. When the sciences were addressed it usually concerned the delivery or advocacy of core courses (Bassoff, 1983; Connelly, 1978; Wutka & Baxter, 1981). The National Commission on Allied Health Education (1980) claimed program faculty "may be unaware that some of their own courses, particularly in basic sciences, essentially duplicate those of other programs" (p. 144). Of the commission's 70 plus recommendations and subrecommendations one mentioned the sciences.

> Arrangements should be made for maximum use of existing institutional resources, including shared courses. In particular, whenever possible, allied health students should receive instruction in the basic sciences and humanities through participation in general university courses offered by faculty of the department in those disciplines rather than in special courses offered exclusively for allied health majors. (NCAHE, 1980, p. 204)

One explanation of this recommendation may have been the commission's awareness of the difficulty health professions students have reported in transferring credits (Brooks, 1985). This phenomenon was summarized by Rhoton and Gravenstein (1977).

> The typical nursing curriculum prescribed specialty credits in the basic sciences rather than requiring or allowing students to register for comparable courses offered by basic science departments. The level of the nurse's academic preparation in the sciences was therefore not

> comparable to that of other science majors. Nursing students found themselves generally unable to apply their specialty credits toward graduate study in areas outside nursing. (p. 3)

Challenges to the credibility of "prescribed specialty credits in the basic sciences" (Rhoton & Gravenstein, p. 3) for medical or graduate students were not found. Some studies of science course content or the associated delivery system have indicated that there is indeed a basis to question the credibility of these courses for undergraduate health science students (Clarke, 1983; Sirota, 1981) .

Clarke (1983) examined the views of 286 medical technology faculty, students, administrators, and advisors about their curricula. "Differences were found in the academic preparation with deficiencies noted in pathogenic microbiology, immunology, biochemistry, and instrumentation" (p. 2372-A). From a content analysis of mathematics and selected science catalog descriptions and information, Buescher (1984) developed content items which he posited were needed by medical technologists. The opinions of 618 clinical and educational medical technologist directors confirmed many items. In content areas selected there was concurrence on requisite knowledge for a medical technologist.

Sirota (1981) studied the teaching of biochemistry for dietetics students in all programs in the United States by a survey of dietetics directors and biochemistry instructors. One finding was that total class and laboratory contact

hours ranged from 39 to 280.5. Differences in course content and textbook choices depended upon the type of majors in the class. There was more emphasis on qualitative than theoretical or conceptual material. She concluded there was little communication between biochemistry instructors and dietetic departments, minimal input from nutritionists about course content, and "great variability in the biochemistry education of future dietitians" (p. 4467-B).

Krieger (1977) queried 152 allied health and science support faculty in selected Florida community colleges for opinions about needed bio-organic course content. Faculty indicated (a) a preference for minimal laboratory experience, but when appropriate believed it should occur during clinical practice rather than during the chemistry course laboratory; (b) courses should carry general education not specialty credit; and (c) a need to update their own knowledge of the items on the questionnaire.

From a literature review, Perkin and Crandell (1985) established that physician assistants performed "diet therapy and nutrition counseling and/or prescribing" (p. 185) usually without a physician present. They reviewed the curricula of 91% of all U.S. physician assistant programs for nutrition content. Nutrition classes averaged 13.3 clock hours. Content was presented as separate courses, parts of other courses, or during clinical rotations. The authors concluded, that "nutrition content

is rather limited . . . [with] a great deal of variation . . . independent of the type of degree . . . [and] related more to faculty interests and institutional resources than to length of the curriculum" (p. 187).

Gerald (1976) reviewed pharmacology courses taught by college of pharmacy faculty to nonpharmacy majors. He noted the enrollment of many allied health students who did not have a pharmacology course in their curricula. Riley (1978) advocated a "more scientific orientation" (p. 6) and scholarly approach for teaching pharmacology to nursing students. Robinson (1987) reported results of a pharmacology examination given to recently graduated nurses upon initial employment. Nurses who had completed a separate pharmacology course scored significantly better than those who had received pharmacology by an integrated curriculum. In the interest of quality, Freston (1976) proposed that pharmacology departments be responsible for all pharmacology education in any AHC program.

Faculty interest in content and method has stimulated the development of new courses. Wutka and Baxter (1981) described the planning of an "interdisciplinary course in growth and development for allied health students" (p. 248). When education or psychology department faculty presented these courses, they stressed psychosocial development and de-emphasized physical aspects, nutrition, and nonschool age population needs. The courses implemented by the authors corrected these perceived deficiencies.

Giese and Lawler (1978) developed a human physiology course which used a personalized system of instruction. They concluded this approach required more preparation time of students and faculty than traditional approaches, provided more instructor--student interaction, and more flexibility depending on student preexisting knowledge and ability. They advocated this method especially for "schools of allied health which frequently offer courses (particularly basic science courses) which are shared by students from different departments or programs" (p. 273).

Lewis, (1981) described a team taught pathophysiology course for baccalaureate medical technology, nursing, and pharmacy students. Design of this course was preceded by a survey of nursing program pathophysiology courses. Two-thirds of the baccalaureate nursing programs had such a course and there were reported variations in level (sophomore through graduate), credit hours (2 quarter hours through 6 semester hours), and teacher credentials. Reasons the remaining one-third did not have a pathophysiology course were, use of an integrated curriculum, insufficient time, no one qualified on the faculty, or other departments would not teach it.

Another topic in the literature was a concern for the relevance of science content to clinical practice, that is, the development of integrative competence (see p. 9). Boren, Dixon, and Harden (1982) cited and agreed with earlier authors that there is a weakness "between scientific

knowledge and its application . . . nutrition education can not be effective unless it corresponds to real world situations" (p. 148). Barr (1979) designed microbiology courses for associate and baccalaureate medical technology students which she claimed improved the integration between theory and practice. This interest in integrative competence may explain the inconsistency of faculty opinion in Krieger's (1977) study. Faculty wanted the chemistry courses to carry general education credit but when laboratories were indicated they wanted the sessions to occur during clinical rotations.

Vittetoe (1983) reviewed instruments designed and used by others to measure learning styles of health professions students. She generalized that the overwhelming evidence of several studies using different instruments indicate a student preference for concrete and teacher-structured experiences. In her study, she compared the learning styles of physical therapy and medical technology students with each other and over time. From the literature, the study reported, and her 30 years of teaching experience, she "has found that most [allied health] students want factual material presented or directed by the teacher. They want to learn only that which is practical and has direct application to their future roles" (p. 664).

In a study, "Dental Students' and Graduates Perceptions on the Relevance of Selected Basic Science Topics to Clinical Dentistry," Feiker (1976) found agreement between

both groups on what was and was not pertinent. He concluded student perception of topic importance to practice develops early and this "implies that placing some basic science courses later in the curriculum may not effectively resolve the problem of correlation of the basic science with dental practice" (p. 6290-A).

Mentioned in Chapter I was the magnitude of the academic health center governance study (AAHC, 1980a,b,c,d). A decade before a group of faculty and administrators convened to identify "core components of an integrated science course for community college allied health professionals" (Meek, 1970, p. 2). Meek (1970) and her colleagues deplored the detailed demands of accreditation agencies. Over three-fourths of the AAHC governance study respondents hoped for a unified accreditation process, but were less optimistic that it would occur (AAHC, 1980b). The vice presidents reported strong opposition to impingement of accreditation policies on hospital resources (p. 77). Neidle (1985) asked why national licensure procedures excessively should influence dental curricula (p. 16). Neidle (1985) challenged dentistry to identify the science topics without which it is impossible for a dentist to function. "What is the justification . . . for hours of instruction on the pathology of the female reproductive tract" (p. 16) in a dental curriculum?

Consensus on the biophysical science knowledge base for students was implied in some college catalogs (Indiana

University, 1985; University of Texas Medical Branch at Galveston, 1985). It appeared to be an accomplished fact from some accreditation standards (Amer. Dent. Assoc., n.d.; AMA, 1977b). The research evidence was inconclusive (Buescher, 1984; Clarke, 1983; Perkin & Crandall, 1985; Sirota, 1981). King and Breegle (1983) proposed an "urgent need to identify the common components of the categories of allied health professions, provide a common education for them in the basic and social sciences, and then add discipline specific education to this general base" (pp. 103-116).

Students of allied health professions often share courses with others (Barritt, 1980; Giese & Lawler, 1978). Advantages and disadvantages claimed are increased efficiency, facilitation of career mobility, fostering the health care team approach, insufficient depth, irrelevance, and accreditation impediments (Burnett, 1973; Connelly, 1978; "Core Concept in Allied Health, 1973; Meek, 1970; Neidle, 1985). Some have advocated team teaching by scientists and practitioners. The intent is to reduce students' perception of irrelevance and stimulate practitioners to apply scientific principles ("Interdisciplinary Panel Discussion", 1975; Talbert & Walton, 1976). Others have opposed dilution or reduction of science content and expressed the belief that science courses need to be taught by scientists (Freston, 1976; Pitkow & Davis, 1975). Authors of an 1984 American

Association of Medical Colleges study questioned if physician faculty members were capable of biomedical science instruction without help from the scientists (Neidle, 1985).

Many have suggested better communication between practitioners and scientists (Christensen, 1972; "Core Concept in Allied Health", 1973; "Interdisciplinary Panel Discussion", 1975; Meek, 1970; Sachs & Reynolds, 1983). "The science faculty need not only speak in tongues (symbols) and the allied health faculty [need] not only speak in tasks (jobs) if the two groups are to communicate with each other" (Meek, 1970, p. 7). Both medical and science literature document the differences between practitioner and science faculty (Jason & Westberg, 1982). "An advantage to working in many private medical schools is the absence of a large number of allied health programs that require an extensive teaching load. . . . You will be better able to concentrate on developing your research program" (Bell, 1983). Granger (1983) listed six priorities for a successful science career. He apologized for omitting teaching.

Conversely heavy demands from the health professional schools on a pharmacology department encouraged the science faculty to develop a computer assisted teaching system (Pazdernik & Walaszek, 1983). They reported a broader user group than anticipated. Pharmacology standardized test scores improved. A goal of the American Chemical Society Task Force on Chemical Education for Health Professions was

"to open communication . . . to form affiliations with . . . organizations of the health professions" (Treblow, Daly, & Sarquis, 1984, p. 629). The chemists developed a course syllabus but were disappointed because the "professional organizations . . . are caught up in their own problems and agendas . . . [a] two semester course in chemistry is, unfortunately, of minor concern to some health professions" (p. 269).

Science faculties and allied health educators in the community college workshop (Meek, 1970) received praise for their collaboration. But "it is unfortunate a greater dialogue is not always occurring at the administrative levels" (p. 5). Meek (1970) summed up part of the situation when she noted that

> programs in the allied health field are assigned to one pattern of organization and yet a considerable portion of their curriculum is the assigned responsibility of another pattern of organization--with those at the top working under different sets of priorities, how can the faculty upon whom the ultimate work load rests be less than enthused. (p. 5)

Often AHC students outside of medicine "insist they get second class instruction, frequently from junior or less experienced and less qualified faculty" (AAHC, 1980b, p. 2). Many have reported the loyalty of the basic scientists is to the medical students (AAHC, 1980b; Hogness & Akin, 1977). Sachs and Reynolds (1983) disagree and quote Saxon.

> My salary may be paid by the College of Medicine, but my soul belongs to the Graduate College. . . . The arrogance of medical faculties is a bar to genuine interdisciplinary activities and so is the

> arrogance of some in the academic world who view their fields as the only truly academic ones and view medical and other professional schools as trade schools. (Sacks & Reynolds, 1983, p. 146)

Some have expressed the belief that science course delivery system dilemmas would be improved if the departments were removed from college of medicine control (Hogness & Akin, 1977; Needham, 1969). Others have stated that the political power of medicine in the AHC is in part due to its science departments and that medicine would lose prestige by this separation (Ebert & Brown, 1983; Petersdorf & Wilson, 1982; Weil, 1970). It has been noted that it is the science faculty and not the clinical physician faculty that usually have graduate faculty appointments, tenure, and higher ranks (Jason & Westberg, 1982; Sachs & Reynolds, 1983).

In the governance study the vice presidents viewed health center decision making "as a relatively well-controlled system" (AAHC, 1980b, p. 58) with themselves as leaders. They reported seriously considering the deans' recommendations. The allied health deans did not share this perspective. They were dissatisfied with their influence on AHC decision making. College-wide, Wilson (1977) found that allied health faculty believed their deans had little influence as educational leaders. The deans wanted a greater role in college academic affairs.

Miller, Beckham, and Pathak (1983) studied formal and informal missions and goals of 41 colleges of allied health.

A goal, to "conduct comprehensive program[s] of health sciences curricula" was considered formally operant by 65.7% of faculty and 46.7% of the administrators. This finding surprised the investigators. Miller et al. thought the administrators would be more likely to support and formalize comprehensive program development. This "raises questions as to the administrators perceptions" (p. 18). The explanation was that administrators were more concerned with comprehensive allied health curricula. Faculty were more interested in the health--biophysical--sciences.

This part of the literature review has documented the importance which the health professionals ascribe to the biophysical sciences. Course content and delivery system challenges have been identified. The interface between the curricula and the course delivery system has been established. Consensus about biophysical science courses, their content, and their delivery, has apparently not been achieved among the allied health professions.

Summary

This entire literature review has presented an overview of the academic health center and the colleges of allied health. Stark's framework (Stark et al., 1986) and the dependence of the study herein on it to develop the criteria was explained. A content analysis of 21 sets of accreditation standards was presented. Published information from 51 colleges of allied health was reviewed.

Prior studies indicate that the science course delivery system presented problems across programs and science disciplines. Although there were multiple accreditation standards there were no known criteria upon which AHC allied health faculty and administrators could rely as a guide for their science course delivery system.

CHAPTER III

METHOD

Explained in this chapter is the study population, selection of the colleges, selection of the preliminary activity participants and panel experts, and how the science related courses were identified. The modified Delphi method used is reviewed. The chapter is concluded with a discussion of the methods used to analyze the data from the Delphi study and develop the criteria.

Population

Colleges of allied health in academic health centers that are members of the Association of Academic Health Centers (n=60) constituted the college population for this study (see Table 7). The chief administrative officers (deans) of the colleges, their immediate associates, and assistants constituted the administrator population. The faculty consisted of two groups, basic scientists and allied health professionals. The basic scientists were those with or without a CAH faculty appointment, who did not hold a health professional credential, but who taught any of the identified science related courses. The allied health professionals were those who possessed a health professional

credential, held a full-time CAH faculty appointment, and taught or arranged for science related courses for baccalaureate allied health students.

Selection of the Colleges of Allied Health

In 1987 about 75% of all AHCs belonged to the Association of Academic Health Centers (AAHC) (AAHC, 1987; Association of American Medical Colleges, 1987). A goal of the AAHC, "to be the national resource for higher education concerned primarily with issues--of a multi-professional and interdisciplinary nature--involving health manpower education . . ." (AAHC, 1986, p. ii) was congruent with this study. The AAHC directory listed the major academic and health care units for each member institution. Perusal of this directory showed the membership to be among the North American leaders in both higher education and health care (Carnegie Foundation's Classification, 1987; Kruzas, 1980).

A catalog that described baccalaureate allied health programs was requested from the 60 member institutions which listed units of allied health (see Appendix A). After one follow-up letter, 51 (85%) had responded (see Appendix B). Nineteen colleges, those without a definitive administrative structure (the coordinated structure) and those with fewer than three generic baccalaureate programs were eliminated. The purpose was to reduce the logistical problems of communicating with several program directors. Also, it was assumed that colleges with more programs would offer more

science related courses and probably encounter more challenges with the associated delivery system. The Universities of Florida and Alabama at Birmingham were eliminated because some of their personnel participated in activities preliminary to this study. This left 30 CAHs.

Two deans of allied health were asked to identify 15 leading colleges among this group of 30. The deans were provided with a list of the 30 colleges and asked to select the most representative mix (control, structure, program diversity, and geographic location) of outstanding colleges (see Appendices C and D). The investigator also made an independent assessment based upon statements gleaned from all catalogs and correspondence. Information considered was (a) whether or not course descriptions were received, (b) number and names of baccalaureate programs, (c) college structure and control, and (d) whether or not the science related course delivery structure was discernable. An effort was made to include colleges with programs less frequently encountered or new to higher education. The 15 that received the most votes from the deans and investigator were selected as the 10 leading colleges and 5 alternates in priority order of total votes.

Selection of Preliminary Activity Participants

As discussed, two academic health center deans of allied health served to nominate the colleges. The deans

were selected because their colleges met all criteria for inclusion in this study and the investigator knew both.

Three persons assisted the investigator with the initial activities for the identification of science related courses. Two were graduate students with an undergraduate science degree and one was an allied health professional. Three other individuals actually served to identify the science related courses offered by the colleges nominated to participate in this study. These three persons had health center faculty appointments at the University of Florida. Also, they were involved during the academic year in the teaching of, or administrative activities for, science related courses. These persons plus the investigator constituted two basic scientists and two health professionals outside of allied health (nursing and pharmacy).

Three persons critiqued the instrument which listed the proposed criteria as well as reviewed each criterion. These persons were the dean and two faculty, a basic scientist and an allied health professional, all of the College of Health Related professions of the University of Florida. They were representative of the panel experts who were later asked to participate in this study.

Some persons participated in more than one of the activities just mentioned. Altogether eight individuals from four colleges (two allied health, education, and pharmacy) at two universities contributed to nominate,

identify, validate, or critique the colleges, courses, and proposed criteria. All had been requested to assist the investigator in person or by telephone.

Identification of the Sciences

Because of the ambiguous and changing distinctions among the modifiers used to describe science courses in health professions curricula (applied, basic, bridge, clinical, fundamental, professional) (Thier, 1987) the term science related course (SRC) was used in discussion and correspondence with all preliminary participants and panel experts. Panel experts did not determine science related courses for their own institutions. They were supplied with a list of preselected science related courses specific to their respective colleges' curricula. These courses were the ones that panel experts were asked to consider in determining criteria for evaluation of the delivery system.

The procedure employed to identify the science related courses is summarized as follows.

1. Reviewed course descriptions from all CAHs from which catalog descriptions were received.
2. Identified tentative science related courses from among these descriptions.
3. Validated this opinion by the judgments of two others.
4. Extracted course descriptions from the catalogs of the CAHs nominated to participate in this study.

Deleted course titles and inserted a substitute numbering system.

5. Wrote instructions and constructed packet for the University of Florida faculty to use in identifying the science related courses among these course descriptions.

6. Tabulated votes and prepared a list of science related courses specific to each of the 10 colleges nominated to participate.

To qualify tentatively as science related, a course had to be required for students of one or more baccalaureate allied health program(s) during the professional phase of their programs. With few exceptions, each course title included the name of a biophysical science, for example, nutrition or radiation physics, not dietetics or clinical radiology. Descriptions of clinical practice courses, whether or not the title included a science, were excluded.

Stark's framework (Stark et al., 1986) was then used to identify further which of these course descriptions were science related. It was selected because it was cross-professional and both inputs (the delivery system) and outputs (professional competencies) were addressed. In the judgments of all evaluators registering an opinion, the course description must have (a) concerned the biophysical sciences and (b) encompassed the development of conceptual competence as a major purpose of the course. The development of integrative competence may or may not have

been an apparent secondary purpose, as reflected by the description. Also the course description may or may not have implied that the course instructor(s) was a health professional or basic scientist.

The purpose of the initial identification of science related courses from all catalogs was to determine if it was feasible to use Stark's framework to identify and validate the courses. Over 400 course descriptions were reviewed. Although not quantified, congruent judgments among the investigator and two others were noted for about 75% of the course descriptions. This was considered sufficient to proceed with the use of Stark's framework. It was then used to identify science related courses in the allied health curricula at the University of Florida. This list was prepared for use by the participants who would critique the proposed criteria.

Several factors were not to influence the decision to identify a course as science related. Among these were course level; college, department, or faculty conducting the courses; scope; type of allied health student(s); and science discipline. This was facilitated by substitution of an investigator developed numbering system, by not including the course title, and by not identifying the colleges participating. Evaluators received verbal and written guidelines to assist in avoiding these influences. (See Appendices E and F).

The catalog review indicated that some science related courses would be graduate level. Also for the colleges where students were admitted into the professional programs as freshmen, some science related courses would be broad based or lower division. The substitute numbering system was intended to obscure course level and discipline or allied health identity, that is, factors not to be considered.

Evidence that a course might encompass more or less rigor based upon college or department sponsor has been presented in Chapter II (Brooks, 1985; Rhoton & Gravenstein, 1977). To guard against this possible bias among evaluators, course titles were not included and the colleges were not identified. A course titled biochemistry for dental hygienists, was to be considered no more or no less science related than biochemistry for medical technologists or biochemistry for undergraduate chemistry majors. College or department sponsor was irrelevant. The evaluators were to base their judgments on the course descriptions apparent content and fulfillment of the conceptual competence outcome identified by Stark.

Evidence of professional "turf guarding" of curricula was also presented in Chapter II (Meek, 1970; NCAHE, 1980; Sachs & Reynolds, 1983). This may have occurred during the activities associated with the identification of these courses. After the procedure to identify the science related courses was deemed feasible, it was decided to use

one basic science and one allied health faculty member to validate the science related courses from the curricula of the nominated colleges. Both basic science and allied health faculty received the same packet and instructions (see Appendices E and F).

Table 8 shows the markedly different opinion of the allied health faculty evaluator. Adjacent to some descriptions this evaluator wrote in comments such as "we do not consider these courses as having much scientific depth" or "sounds superficial." Recall that level and scope were not to have influenced the decision. Review of

Table 8

Identification of Science Related Courses (SRC) from Catalog Course Descriptions

	Number Identified as SRC[a]		
Evaluator	yes	no	not sure
Allied Health Faculty	84	116	3 + 11[b]
Pharmacy Faculty	156	7	51
Basic Science Faculty	204	10	0
Basic Science Faculty	192	17	5
Investigator (Nursing)	183	16	15

[a] Total course descriptions (n=214).
[b] Evaluator skipped one page.

this evaluator's selections indicated that he/she eliminated course descriptions that implied a broad scope, an introductory level, or for which a particular allied health profession was named or implied in the description.

It was decided to add another basic scientist and substitute a health professional faculty member from a nonallied health field to identify the courses. Since the investigator could be perceived as representing nursing, a pharmacist was chosen. Thus the investigator and three health center faculty served to identify and validate the course descriptions which met the stated criteria. All evaluators had taught in baccalaureate health professional programs. The three received written and verbal instructions from the investigator and all provided independent appraisals (see Appendices E and F).

There was complete agreement that 138 descriptions of 214 met the criteria. For 38 additional descriptions, one of the four evaluators was unsure, but the others agreed that they met the criteria. Thus 176 course descriptions with a reliability coefficient of .94 were identified as science related among the 10 colleges. A sample of the course descriptions is in Appendix G.

Selection and Role of the Panel Experts

Choice of administrator panel experts was a function of their positions in one of the selected colleges. The deans were mailed a letter stating the purpose of this study, its significance, why they were selected, and their role (see Appendix H). A letter of support from a dean emeritus, Dr. Darrel Mase who had been very active in the allied health field, was included (see Appendix I). The deans were then

telephoned and asked to help develop college-wide criteria for the science related course delivery system. Eight agreed, one of whom later had to withdraw.

Each dean who agreed to participate was asked to confirm a list of generic baccalaureate degree programs for their college (see Appendix J). Each was asked to nominate two allied health faculty members who (a) had a full-time CAH appointment, (b) had a health professional credential and, (c) were involved in the teaching or delivery of any of the science related courses identified for the curricula of their college. Each was asked to nominate two basic science faculty who (a) had primary appointments in any unit of the university, (b) had graduate, preferably doctoral degrees in any of the biophysical science disciplines, and (c) who taught any of the science related courses identified for the college's curricula (see Appendix J).

In order to obtain broad program representation, at least one faculty member from the allied health group was required to be associated with any program except medical technology, occupational therapy, or physical therapy. This was because relative to these programs, the others are underrepresented. Four faculty nominees were requested in order to provide for those not wanting to participate and to insure broad allied health profession and basic science representation.

The use of administrators to identify faculty participants for research studies is acceptable practice in

higher education (Stark, Lowther, & Hagerty, 1987). Seven deans nominated 23 faculty, 17 of whom were invited to participate and 14 did. Thus the panel consisted of 21 experts with allied health, basic science, and administrator representation. The professions and disciplines known to have been represented by the participants included anatomy, anesthesiology, biomedical engineering, cardiopulmonary science, chemistry, dietetics, extracorporeal circulation technology, medical records administration, medical technology, occupational therapy, pathology, pharmacology, physical therapy, and physiology.

Upon receipt of program confirmation and faculty nominees from the deans, each of the 17 faculty members was mailed a letter of introduction (see Appendices K and L). This explained the purpose and significance of the study and the reasons they were chosen to participate. Their role and approximate time commitment was mentioned. The role of all experts was to participate in a group communication process, known as the Delphi technique, by responding to statements concerning science related course delivery systems.

The Delphi Technique

Delphi is "characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem" (Linstone & Turoff, 1975, p. 3). It is circumstance and not the inherent nature of a problem that

determines the feasibility of Delphi. Among these circumstances are (a) the problem does not lend itself to precise analytical techniques, (b) the individuals needed to participate have no history of adequate communication and may represent diverse backgrounds, (c) time and cost make group meetings infeasible, and (d) heterogeneity must be preserved to assure validity or to avoid domination by a particular group or person (Linstone & Turoff, 1975). Lewis, (1984), cited Helmer and Weaver in her definition of the Delphi technique. It

> involves the opinions and predictions of carefully chosen experts who react . . . to 'a carefully designed program of sequential individual interrogations . . . and opinion feedback.' The technique has three features (Weaver, 1971): anonymous response, iteration and controlled feedback, and statistical group response. (Lewis, 1984, p. 5)

Linderman (1981) cited Quade as having described the first known utilization of the Delphi process. This occurred around 1948 and was used to predict horse race outcomes. Olaf Helmer, a mathematician-philosopher is credited with the development and use of the first true Delphi technique. His 1953 study was sponsored by the United States Air Force under the auspices of the Rand Corporation and concerned strategic defense forecasting. It was classified as secret and was not published until 1962 (Linderman, 1981).

During the past 25 years the uses of Delphi have expanded from forecasting to decision-making, risk analysis,

and goal setting (Lewis, 1984). It has been used in diverse fields such as government, industry, business, science, and the professions (Linderman, 1981 ; Linstone & Turoff, 1975). Since the 1970s it has been used extensively in health care research and later education (Lewis, 1984; Linstone & Turoff, 1975). Higher education lends itself to the use of Delphi because of the extensive use of participative planning, disdain for authoritarianism, and an established bureaucracy which encourages procedure and tolerates questionnaires (Linstone & Turoff, 1975).

Lewis (1984) examined Delphi studies conducted in higher education from 1967 through 1981. Among the studies cited and analyzed, the number of panelists ranged from six to several hundred. Panelists had been selected for political expediency as well as or in lieu of expertise. Of the 26 studies analyzed consensus was sought in 24 but not measured in 18 of these. Fifteen of the 26 studies consisted of three rounds. Most administrator participants in these studies had not had prior experience with the technique. When examined, faculty and administrator differences were insignificant.

There have also been several Delphi studies specific to health professions education. Lewis (1984) reviewed one concerning a pediatric medical department and another regarding pathology department chairpersons goals for the specialty. Fazio (1985) reported use of the Delphi procedure to assess a medical school's needs and goals.

Jacobsen (1977) used it to gain consensus on interdisciplinary health professions education. Blayney and Rogers (1980-81) developed characteristics for leading colleges of allied health with a modified Delphi technique. Elder (1985) employed the Delphi to develop future objectives for colleges of allied health. He cited The Organization and Governance Study of Academic Health Centers as "one of the most effective" (p. 26) uses of the Delphi to forecast and gain consensus.

As a research technique the Delphi seems incompatible with controlled experimentation (Linstone S Turoff, 1975). Nash (1978) discussed a report by Sackman in which the latter claimed the Delphi is lacking in validity, reliability, and sampling methodology. Nash (1978) summarized eight Delphi studies conducted in education. He generalized that the investigators of these studies did not use experts, did not generate items consistently, and were subject to bias. Other weaknesses cited were that the researchers did "not explore characteristics of nonrespondents . . . [or] examine participant commitment or fatigue" (p. 46). However several of his criticisms may be applicable to other methods. And certainly the Delphi does not have a monopoly on researcher bias (Bogdan & Biklen, 1982; Borg & Gall, 1983).

Weaver faulted the Delphi reliance on experts (Nash, 1978). Delphi experts are typically people of position or power and are unlikely to include radical thinkers or the

disenfranchised. It is probable that the experts in control will be more successful in implementing their own Delphi generated forecasts. Thus, position and power may account for the accuracy of pooled expert opinion. The inaccuracy of Delphi forecasting may also be attributed to position and power. If the forecast is perceived as undesirable it may promote change. The forecasters, unhappy with their forecast, implement change to avoid perceived impending disaster. The Delphi expert forecast then proves inaccurate (Linstone & Turoff, 1975).

As a communication mechanism, the Delphi is not faultless. For example, with the paper and pencil Delphi there is a built in time lag and nonverbal clues are lost. Differences in language and logic of the participants may occur. Other possible communication weaknesses noted, germane to this study, and over which the investigator has some control include overspecification, inaccurate reporting of literal data, investigator influence on the responses, and the use of Delphi to substitute for all needed communication (Linstone & Turoff, 1975). Approaches to insure the validity and communicative integrity of this study have been described and will be further discussed in the context of the remainder of this chapter.

In defense of the Delphi, it provides the individual with great freedom of expression, assures anonymity, and prevents dominance by any one individual (Linstone & Turoff, 1975). Since its initial use, the volume of Delphi studies

has expanded in number, across disciplines, and types of applications. Often its critics still advocate its use (Nash, 1978). When the circumstances are right, Delphi may indeed be the research method of choice (Linstone & Turoff, 1975).

Data Analysis and Criteria Development

Once the research questions were posed, the literature review, including the content analyses of the accreditation standards and catalogs, provided the initial guide for criterion development. Stark's framework provided further structure. Each proposed statement represented an element of the external, intraorganizational, or internal influences as defined by Stark et al. (1986) (see Figure 2). Recurrent themes in the literature in conjunction with a conceptual framework have been used to develop criteria by other investigators (Hekimian, 1984).

The initial set of proposed criteria consisted of 48 statements and 4 open-ended questions. The preliminary packet included these items, definitions, a list of science related courses for the University of Florida, background information, and directions. It provided space for revisions and suggestions and asked the three reviewers of the instrument to agree or disagree with each statement. After their perusal of the instrument each reviewer was interviewed.

The statements and supporting information were revised and prepared for the panel experts. The first round instrument contained 50 statements of which 3 were rank order. Among the statements there was a total of 94 items that required a response. Additionally, there were 4 open-ended statements or questions. Participants from the colleges were asked to agree or disagree with the statements and encouraged to write in brief comments or opinions. The latter was facilitated by the instructions and ample white space.

The second round instrument included 9 additional, revised, or new statements plus all of the original statements. Panel experts were provided with the group response from round one for each item. If 100% consensus had been reached on an item the statement was retained but the brackets above the number of votes were deleted. Written contributions from all participants were printed verbatim on the page facing the statement(s) to which they referred. Panel experts were again asked to agree or to disagree with each item for which consensus had not been achieved.

The final instrument (see Appendix O) included all items from the first two rounds, except the open-ended statements. These were deleted. Panel experts were provided with all unedited narrative data from both rounds, the group vote from round two, and their individual round two vote for each item. Each expert was asked if he or she

would like a copy of the resulting criteria and a summary. The deans were asked for consent to name their respective colleges as having provided the participants for this study.

The time frame for the entire study was the fall academic term. The first contact with the deans was made just after Labor Day, and the due date for all experts to return the round three instrument was December 11. This was a compact but workable schedule. Twenty-one, 19, and 18 participants met the deadlines for the respective rounds.

The data to be analyzed consisted of dichotomous responses to the statements and literal feedback. Responses from each panelist about each item for each round was recorded as received. All literal feedback was recorded adjacent to each statement and identified by round when it was contributed. Individual authors were not identified, but status (dean, allied health, or basic scientist), was indicated. Results from the three statements asking for a rank order were recorded for relative frequency. The raw numerical data were recorded and provided to the panel experts.

The interpretation of literal data from a Delphi study is often accompanied by inductive reasoning. When this approach is used, as in this study, it is imperative to incorporate measures to reduce investigator bias. To analyze the data but avoid these weaknesses certain procedures were followed. Each original statement, even if consensus had been reached, was retained for panel expert

reference in the subsequent instruments. Narrative input from the panel experts was reported in total and not edited or summarized. All proposed item additions were verified or reinterpreted by a knowledgeable expert, who was not conducting this study. As recommended by Linstone and Turoff (1975) the investigator served as the person knowledgeable in the problem and the expert served as editor and monitor to insure accurate reporting and eliminate bias. In cases of ambiguity the pilot experts could have been called upon for an interpretation.

The percent of agreement needed to define consensus was 100% of those reporting an opinion for the first or second round and 80% of those reporting an opinion for the final round. To identify an item as a criterion, 100% consensus was needed. Items which received 80% consensus may have been recommended as a criterion depending upon the literature review and narrative contributions of the panel experts.

Described in this chapter were the preliminary activities necessary before this study could be undertaken. The methodology of the study was explained as were the procedures to reduce investigator bias. The data analysis and definition for consensus were discussed. It has explained that the investigator employed 21 experts from 7 institutions, relied upon a framework to generate items consistently, and endeavored to avoid bias by the active participation of eight others prior to and during the course of this study.

CHAPTER IV

RESULTS

The purpose of this chapter is to present and discuss the results obtained in this three round Delphi study. The Chapter is divided into six sections. In the first section the responses to the preliminary statements (01 through 04A) will be discussed. In the next four the results for each of the four research questions will be presented. This will be followed by a summary. For the readers perusal, the instrument and vote for each statement on each round are in Appendices O and P respectively.

Selected responses from the panelists, whether in support or dissent of an outcome for a given statement will be incorporated as the results for the individual statements or sets of statements are discussed. Comments regarding the four open-ended questions/statements will be presented in context with the sets of statements which relate to each research question.

Statements which were added to the instrument for subsequent rounds are indicated by a letter in the statement prefix e.g., 01A. The percent of consensus (100% or 80%), if any, and the round in which it was achieved is illustrated in the tables accompanying this chapter. If the

consensus was in disagreement with the statement this is indicated by a "D" following the percent of consensus indicated. If by round three consensus was less than 80% on an item this is indicated by a zero in the last column.

Preliminary Statements

Although the preliminary statements (01 through 04A) did not directly answer any of the research questions, they were included to determine if participants believed that the biophysical science knowledge bases antecedent to professional practice have been agreed upon (statements 01 and OlA) (see Table 9). They were also included to ascertain if allied health faculty members should be qualified to teach all of a programs science related courses, that is, the courses identified as containing the conceptual biophysical science knowledge base (statements 04, and 04A) (see Table 9). Third, they were included to determine if among the participants there was a basis for them to identify and validate these criteria (statements 02 through 03) (see Table 10). Statements 32 through 34 also related to this point but will be discussed later.

On round one, 16 of 21 participants agreed that the biophysical science knowledge bases which individual allied health professions deem necessary for practice have been agreed upon (statement 01). One participant wrote, "In general I agree, yet I am also of the opinion that for a number (more than 2) of the allied health professions there

Table 9

Percent Consensus re: Statements 01, 01A, 04, and 04A

Statement	Round I	Round II	Round III
01 The biophysical science knowledge bases which individual allied health professions deem necessary for practice have been agreed upon by members of the respective professions.	--	--	80
01A REVISED STATEMENT: The biophysical science knowledge bases which individual allied health professions deem necessary for practice have been agreed upon by members of most of the respective professions.	--	--	80
04 Allied health credentialed faculty should be able to teach any science related course required of baccalaureate students in their respective professional phase curricula.	--	--	80D
04A REVISED STATEMENT; Allied health credentialed faculty should be qualified to teach any science related course required of baccalaureate students in their respective professional phase curricula.	--	--	80D

Note. D = Disagree.

is little if any agreement." Another stated, "In many cases the individuals within the CAH have little or no appreciation of the basic science itself and teach it as a cookbook exercise." Recall that the literature support for statement 01 is inconclusive. Because of this and the written input, an additional statement, 01A which modified the statement to read 'most of' the allied health professions had agreed upon a knowledge base, was added to the round two instrument. For both statements 80% consensus was reached on round three (see Table 9).

The statements (04 and 04A) that allied health credentialed faculty should be able (qualified) to teach any science related course required of baccalaureate students in their respective curricula prompted input reflecting the specialized nature of many of the allied health professions. "Oftentimes the allied health professions are so specialized basic science instruction would distract teaching faculty." "The statement is preposterous. No one is qualified to teach everything." "A single faculty member should teach in her area of expertise." "You wouldn't want a psychiatrist to remove your appendix!" "Why be part of a university if each school/college is going to duplicate the effort?" For both statements there was one participant who agreed but did not provide a rationale for the opinion.

In statements 02 and 03 panelists were asked to rank the importance of university mission, college mission, and accreditation for establishing science related course

faculty academic and professional credential requirements (see Table 10). The rank of importance of the three factors, for establishing faculty academic credentials remained the same between the first two rounds (university, college, accreditation). This statement was eliminated from further consideration. Movement of opinion concerning the importance in establishing faculty professional credentials was more pronounced, with college mission occupying a different rank on each round. But the significance of the entire statement may be moot, because a majority disagreed that science related course faculty should have a health professional credential (see Table 11, statement 06). "I don't care if basic science faculty have <u>any</u> [emphasis original] professional credentials".

Twenty narrative responses were contributed. "I believe that professional accreditation standards should be more important. However there still exists mail order diploma mills that allow individuals to participate in some allied health professions." "Academic faculty <u>must</u> [emphasis original] respond to college/university missions to obtain tenure." "The academic credential of the science related faculty is the institutions responsibility (and prerogative) more than the accreditation standard; although it is an appropirate concern as expressed in the standard." "In an academic institution the mission of the college has priority if that college is to remain part of the institution.

Table 10

Rank of Importance of Factors in Establishing Science Related Course Faculty Credentials

02 Which of the following should be most important in establishing preferred science related course faculty academic credentials?

	Votes in Round		Rank in Round	
	I	II	I	II
Univ. Mission				
most important	12	9		
intermediate	3	2	1	1
least important	6	5		
CAH Mission				
most important	10	5		
intermediate	7	10	2	2
least important	2	2		
Accreditation				
most important	4	2		
intermediate	9	2	3	3
least important	6	10		

Table 10--continued

03 Which of the following should be most important in establishing preferred science related course faculty professional credentials?

	Votes in Round[a]			Rank in Round		
	I	II	III	I	II	III
Univ. Mission						
most important	8	8	10			
intermediate	5	3	2	2	1	1
least important	6	6	4			
CAH Mission						
most important	11	3	3			
intermediate	8	12	13	1	3	2
least important	2	0	0			
Accreditation						
most important	6	5	3			
intermediate	6	2	2	3	2	3
least important	7	9	11			

[a] Some did not rank all three.

Accreditation standards cannot control a college mission but should be compatible with that mission." "I don't see how the professional credentials necessarily relate to basic science instruction." "I consider the university mission as a broad base statement, thus believe the CAH and accrediting bodies are and should be most important in defining the <u>professional</u> [emphasis original] credentials."

Another theme among the narrative responses suggested that the university and college missions "should be unified" and that it was inappropriate to rank these. "[I] cannot imagine these being incongruent," or "I can understand why some did not rank all three."

The responses to the preliminary statements by the panel experts established 80% consensus that the biophysical science knowledge bases for the allied health professions have been agreed upon, and that individual faculty should not be expected to be qualified to teach all required science related courses in a baccalaureate curriculum. Among important factors to consider in establishing science related course faculty credential requirements was first the university mission, followed by the college mission and accreditation standards.

Science Related Course Faculty Qualifications

Research question number one was as follows. What professional and academic qualifications should science related course faculty have?

By round three, 11 statements were posed to identify science related course faculty qualifications (see Table 11). Two of these were additions based upon panel expert input. All agreed that science related course faculty should have a primary appointment in the university (statement 09) and demonstrate effectiveness teaching undergraduate allied health students (statement 13A). No one agreed that tenure or senior faculty rank were necessary (statements 10 and 11). Concerning tenure, "they come with and without." Concerning rank, "some instructors and assistant professors are the best teachers." "A blend of all levels would make for stronger departments." All reported graduate students as acceptable science related course faculty assistants (statement 12), "providing they have content, capacity, and interest."

Most indicated that graduate students were not acceptable (80% consensus) as science related course faculty (statement 13). "[I] do not believe they have adequate time while students to give the necessary commitment required. . . . Undergraduates may get shortchanged." Representative minority opinions were "it depends where the graduate student is in his preparation, like ABD." "I have a few faculty members who are pursuing advanced degrees somewhere else. In effect they are 'graduate students'."

Agreement and 80% consensus was recorded for science related course faculty to show evidence of research

Table 11

Percent Consensus re: Science Related Course Faculty Qualifications

Statement	Round I	Round II	Round III
Science related course faculty should:			
05 Have a doctoral degree.	--	--	0
06 Have a health professional credential.	--	--	80D
07 Show evidence of recent/current research or scholarship.	--	--	80
08 Excluding research and scholarship, show evidence of own continuing education.	--	--	80
09 Have a primary faculty appointment in some unit of the university.	--	--	100
10 Hold tenure.	--	--	100D
11 Hold a senior faculty rank (associate or full professor).	--	--	100D
12 Graduate students are acceptable as science related course faculty assistants for college of allied health undergraduates.	--	--	100
13 Graduate students are acceptable as science related course faculty for college of allied health undergraduates.	--	--	80
13A ADDITIONAL STATEMENT: Demonstrate effectiveness teaching undergraduate allied health students.	--	100	--
13B ADDITIONAL STATEMENT: Hold a graduate degree in the same or closely related science of the science to be taught.	--	--	80

Note. D = Disagreement.

(statement 07) and continuing education (statement 08). "Should never stop--why else are universities 'halls of knowledge'." Because continuing education was not defined for statement 08, agreement and 80% consensus for this statement may be deceptive. One expert wrote, "[it] would depend on [the] meaning of continuing education. In broadest sense of reading [I] agree." Another commented, "I don't understand this question, they should do research, it can't be excluded." And another, "this [continuing education] is not enough to credential one to teach the sciences."

A majority agreed that science related course faculty should have a doctoral degree (statement 05) but disagreed that they needed a health professional credential (statement 06). However consensus was not reached for the degree requirement but was 80% against the need for a health professional credential. "A PhD and interest in the field is enough" but the degree should be "in sciences not administration or education." Another "would rather have a nondoctoral who knows/understands the medical field than a doctoral in an inappropriate area." Congruent with this was agreement and 80% consensus for the faculty member to hold a graduate degree in the same or closely related discipline of the science to be taught (statement 13B).

Twenty-one contributions were received in response to the first open-ended statement: Please describe any other qualifications science related course faculty should have.

The suggestions concerned three domains, communication skills, enthusiasm for students and teaching, and formal credentials. Sample contents were the ability to "speak good English," demonstrate "reasonable instructional techniques and skills," and "a desire to improve . . . their instructional capability." Statements supporting enthusiasm for students and teaching were to be a "dedicated teacher," "they should love to teach and be around the students in their charge," or have an "appreciation for the diversity of student interests and needs."

Representative opinions about credentials were more specific. "Ideally those individuals teaching basic science courses should have an advanced degree in a basic science. Those courses which are applied science courses should be taught by individuals with advance degrees and with professional credentials." "Any graduate student teaching in science related courses should be working on a PhD in that science area and be under direct supervision of the allied health person." "Most of the subjects in pathology should be taught by faculty or residents in pathology i.e., they should be <u>MD's</u> [emphasis original] plus have training and experience in pathology." In response to this statement, "this university offers a PhD degree in clinical pathology. Johns Hopkins offers the ScD in the same. I don't understand the <u>MD</u> [emphasis original] restriction."

In summary, 100% of the panel experts agreed that science related course faculty should have a primary

appointment in some unit of the university and demonstrate effectiveness teaching undergraduate students. They agreed graduate students are acceptable as assistants (100% consensus) but not as faculty (80% consensus). All concurred that tenure and a senior faculty rank were not necessary. Most concurred that research (80%) and continuing education (80%) were to be be expected, although the latter was not defined and therefore confusing to some. No consensus was reached on the doctoral degree requirement but 80% consensus was achieved for a science related graduate degree requirement and the absence of a need for a professional credential.

Expectations for Science Related Course Faculty

Research question number two was as follows. In what roles should science related course faculty engage?"

Statements 14 through 22C (see Table 12) served to identify CAH expectations of science related course faculty. Each of these statements was posed thrice, to apply to each of the major organizational science related course delivery structures: (a) college faculty teaching college sponsored courses (CAH F and CAH S), (b) noncollege faculty teaching college sponsored courses (non-CAH F and CAH S), and (c) noncollege faculty teaching required professional phase courses sponsored by other colleges (non-CAH F and non-CAH S).

For faculty with primary appointments in the CAH teaching college sponsored courses there was 100% consensus for seven of the nine statements (see Table 12) and few narrative remarks. All participants expected CAH science related course faculty to participate in curriculum planning (statement 14) and accreditation activities (statement 15), to engage in dialogue with others concerning science related courses (statement 16), to select their teaching methods (statement 20), and to conduct research (statement 21). There was agreement and 100% consensus that these faculty should counsel CAH students (statement 17) and have students evaluate their courses (statement 22). One person who did not agree that faculty should set course goals or develop objectives (statements 18 and 19), wrote that these activities should be a "shared process."

As faculty appointment and course sponsorship were removed from the CAH there was less consensus of faculty role and fewer expectations (see Tables 12 and 13). Regardless of science related course delivery structure, all agreed that faculty should choose their own teaching methods and that students should evaluate the courses (statement 20 and 22).

All concurred that college faculty should conduct research (statement 21), but 80% consensus was reached for this item for noncollege faculty. One expert wrote that the research expectation "would depend, if visiting contract <u>no</u>; [emphasis original] if part of another department in

Table 12

Percent Consensus re: Science Related Course Faculty Roles by Organizational Structure: Sponsor (S) and Faculty (F)

Statement	CAH S CAH F Round I	II	III	CAH S non-CAH F Round I	II	III	non-CAH S non-CAH F Round I	II	III
Relative to the science related courses taught, the college of allied health faculty and administration should expect these science related course faculty to:									
14 Participate in allied health curriculum planning.	100	--	--	--	--	80	--	--	0
15 Participate in program accreditation activities.	100	--	--	--	100	--	--	--	0
16 Participate in collegial dialogue with other college/program faculty about proposed or revised course goals, objectives, and methods.	100	--	--	--	100	--	--	--	80
17 Provide academic counseling to CAH students.	100	--	--	--	--	0	--	--	0
18 Set course goals.	--	--	80	--	--	80	--	--	80
19 Develop course objectives, syllabi; select textbooks.	--	--	80	--	--	80	--	--	80
20 Choose teaching methods.	--	100	--	--	100	--	--	--	100
21 Conduct basic or applied research.	--	100	--	--	--	80	--	--	80
22 Student evaluation of the science related course(s) should be expected.	100	--	--	--	100	--	--	--	100

Table 13

Round III Percent Consensus re: Science Related Course Faculty Roles by Organizational Structure: Sponsor (S) and Faculty (F)

S	CAH S CAH F	CAH S non-CAH F	non-CAH S non-CAH F
14	100	80	0
15	100	100	0
16	100	100	80
17	100	0	0
18	80	80	80
19	80	80	80
20	100	100	100
21	100	80	80
22	100	100	100

Note. Number in the left column refers to the statement (S) number.

university yes [emphasis original]." One panelist did not believe that non-CAH faculty who taught externally sponsored courses should engage in dialogue with CAH faculty (statement 16). No reason was provided.

Opinion was divided regarding participation in curriculum planning and accreditation (statements 14 and 15) by non-CAH faculty teaching externally sponsored courses. This is "actually required by some accreditation bodies," or "faculty need to know how their courses complement curriculum/program" and "these are idealistic statements in a research university."

Responses to the counseling statements (17, 22A, 22B, and 22C) were diverse (see Tables, 12, 13, and 14). Even though the stem for statement 17 and all others in this set (statements 14 through 22) stated, "relative to the science related courses taught," some participants questioned or further specified this. "Unclear as to intent of statement" or I agree "if this pertains to the course being taught." Such clarifications or additional qualifiers were not made for any of the other statements in this set, to which the same stem applied.

In response to the remarks elicited by the counseling statement, three additional statements (22A, 22B, and 22C) were added (see Table 14). Each asked if counseling was appropriate relative to the course and relative to the curriculum. Although 80% consensus was reached for four

Table 14

Round III Percent Consensus re: Science Related Course Faculty Counseling Roles

Statement	Counsel relative to Course	Counsel relative to Curriculum
22A ADDITIONAL STATEMENT: Science related course faculty who are members of the profession to which the students aspire and teaching required courses should provide academic counseling to CAH students.	80	0
22B ADDITIONAL STATEMENT: Science related course faculty (allied health or basic scientist) with CAH primary appointments and teaching required courses should provide academic counseling to CAH students.	80	80
22C ADDITIONAL STATEMENT: Science related course faculty outside of the CAH and teaching required but non-CAH sponsored courses should provide academic counseling to CAH students.	0	80D

Note. D = Disagree.

items in this set, the prominent finding was diversity of opinion. Also about one-fourth did not respond or indicated no opinion. For all rounds some registered their opinion and then added modifications. "If it is related to the course [I agree] otherwise they should refer students to appropriate CAH faculty." One wrote that "only allied health faculty, <u>not</u> [emphasis original] basic scientists" should provide counseling. And another stressed that "<u>all</u> [emphasis original] teachers should provide academic counseling."

Among the four counseling statements there were nine items, none of which asked exactly the same thing. One hundred percent consensus was not attained for any of these items except that college faculty teaching college sponsored courses should provide academic counseling. Most concurred (80% consensus) that professional faculty should provide course counseling (statement 22A) but no consensus was reached for professional faculty to provide curriculum counseling. One wrote that "some faculty may be a member of the profession but removed from current up-to-date clinical practice." A majority disagreed that non-CAH faculty teaching required non-CAH sponsored science related courses should provide academic counseling to CAH students relative to the course (statement 22C). There was 80% consensus that these faculty not provide curricular counseling.

In response to the open-ended question (What other expectations should the CAH have of science related course

faculty?), contributions concerned three areas, service, teaching, and knowledge about allied health. The faculty should "serve on academic committees like admissions" or "participate in . . . university service." They should have "some knowledge of the mission of the college of allied health" or awareness of "the professional goals of the various allied health disciplines." Opinions about teaching ability were similar to those submitted in response to the faculty qualification statement. "They should love their work" or "provide practical examples for the students field."

In summary, 100% consensus was reached for all faculty to select their teaching methods and to have students evaluate the courses. Except for one dissenting vote regarding course goals and objectives there was 100% consensus that all other expectations listed were CAH faculty responsibilities. Although there was a preponderance of nonconsensus and much diversity on the counseling issue the emergent theme is that this is a CAH faculty responsibility.

Faculty teaching non-CAH sponsored courses were generally accorded the same expectations as CAH faculty regarding specific course activities. The major exception was academic counseling. For broad based activities such as curriculum planning and accreditation activities there were fewer expectations for noncollege faculty. Some panel experts had identical expectations for most faculty

regardless of science related course organizational structure. "Irrespective of the location of the faculty, . . . instructors need to be sensitive to the needs of their students."

Role of Dean and Faculty in Evaluation of Non-CAH Faculty

Research question number three was as follows. What role should the college of allied health dean and faculty have in the evaluation of science related course faculty who do not have primary appointments in the college?

Asked in the initial statements about CAH dean responsibility for science related courses and faculty (see Table 15) was if the dean should have responsibility for all CAH sponsored courses regardless of faculty status (statement 23) and for all required courses regardless of college sponsor (statement 24). Statement 25 asked if the dean was responsible for a course should the dean also have responsibility to evaluate the faculty. Most agreed with these statements, resulting in 80% consensus. One panel expert who disagreed asked, "how can one dean be directly academically responsible for a science course that is under the administration of another dean? . . . The fiscal [emphasis original] decision rests with the dean of the unit presenting the course." Also "the responsibility may be shared" or the CAH dean may "be asked for evaluation input."

Agreement and 100% consensus was obtained for statement 25A (Deans of the respective colleges should have

Table 15

Percent Consensus re: Role of the CAH Dean in Evaluation of non-CAH Science Related Courses

Statement	Round I	Round II	Round III
23 The college of allied health dean should have administrative and academic responsibility for all college sponsored science related courses (no matter where the teaching faculty hold their primary appointment).	--	--	80
24 The college of allied health dean should have responsibility for the academic integrity of all required professional phase science related courses (no matter what college or department sponsors them).	--	--	80
24A ADDITIONAL STATEMENT: The college of allied health should have responsibility for the academic integrity of all required professional phase science related courses sponsored by the CAH.	--	--	80
25 In situations where the college of allied health dean should have academic or administrative course responsibility he should also have responsibility to evaluate the science related course faculty.	--	--	80
25A ADDITIONAL STATEMENT: Deans of the respective colleges should have responsibility for the academic integrity of all courses sponsored by their colleges.	--	--	100

responsibility for the academic integrity of all courses sponsored by their colleges.) Statement 24A was about the same thing (see Table 15) but in reference to the CAH. This received 80% consensus. Among the deans, both statements 25A and 24A received 100% consensus.

Statements 26 through 31 were about the college of allied health faculty role in the evaluation of non-CAH faculty who teach science related courses sponsored by the CAH and sponsored externally (see Table 16). All agreed that these faculty should be evaluated (statement 29), that the evaluation should address all CAH expectations (statement 28), and be communicated to the faculty member and his or her dean or department chairperson (statement 30). "Evaluations should be communicated to the faculty member teaching the course and if necessary to the head of the faculty members primary department and that is all unless the faculty member is in the CAH." "The mission for which the faculty member was asked to join the faculty should be clearly defined as well as a clear definition of the guidelines for promotion, raises, services, etc."

Most panel experts did not agree (80% consensus) that the CAH evaluation should be confined to a decision to retain or displace the faculty member (statement 26) or course (statement 27). Most agreed (80% consensus) that the evaluation should affect tenure and promotion for the faculty member in his or her respective department (statement 31).

Table 16

Percent Consensus re: CAH Evaluation of non-CAH Faculty Who Teach Science Related Courses

	Courses sponsored by					
	CAH Round			non-CAH Round		
Statement	I	II	III	I	II	III
Formal college of allied health evaluation of science related faculty who teach required professional phase course should:						
26 Be confined to the decision to retain or dismiss the faculty member.	--	--	80D		NA	
27 Be confined to the decision to retain the course as required or not.	--	--	80D	--	--	0
28 Address all expectations the college of allied health has of the faculty member.	--	100	--	--	100	--
29 Not occur.	--	100	--	--	100	--
30 Be communicated to the science related course faculty and his/her chair or dean.	--	100	--	--	100	--
31 Affect merit raise, tenure, and promotion decisions made by the science related course faculty members primary department.	--	--	80	--	--	80

Note. D = Disagree.

In summary, participants believed that non-CAH science related course faculty should be evaluated by CAH faculty and administration and that the evaluation be communicated to the faculty member and his or her primary department. The deans were to be responsible ultimately for the courses sponsored by their respective colleges. If problems occur with externally based faculty or courses, communication was identified as a method of choice for resolving differences. "If I'm unhappy with an anatomy course sponsored by the college of medicine I'd sit down with the dean of medicine and work it out cooperatively."

CAH Control of Delivery and Content of Science Related Courses

Research question number four was as follows. "What control should the college of allied health faculty and dean have upon the delivery and content of science related courses?"

The purpose of statements 32 through 34 was to determine if the participants perceived themselves as responsible for the curricula. In effect they were preliminary statements for this section. The panel experts indicated that curricula responsibility (statement 32) belonged first to the faculty, followed by accreditation, and dean (see Table 17). The relative rank among these choices remained constant in the first two rounds so the statement was not ranked in round three. Statement 33 (see Table 18), which stated that curricula responsibility be

Table 17

Rank of Locus of Responsibility for Allied Health Curricula

32 Please rank order where the primary responsibility for the allied health curricula should rest.

	Votes in Round[a]		Rank in Round	
	I	II	I	II
Dean				
most responsibility	2	0		
intermediate	6	5	3	3
least responsibility	11	13		
Faculty				
most responsibility	14	17		
intermediate	5	2	1	1
least responsibility	1	0		
Accreditation				
most responsibility	4	2		
intermediate	8	12	2	2
least responsibility	7	5		

[a] Some did not rank all three.

Table 18

Percent Consensus re: Curricula Responsibility

Statement	Round I	Round II	Round III
33 Responsibility for the allied health curricula should be shared by the faculty and administration.	--	--	100
34 Responsibility for the allied health curricula should be shared by all instructional personnel (class, laboratory, and clinical) regardless of appointment.	--	--	80

shared by faculty and administration, received agreement and 100% consensus. Most also agreed (80% consensus) that all instructional personnel should share curricular responsibility (statement 34).

Narrative data for these statements indicated that "all should have input" but "not necessarily equally." The "final responsibility should rest with department faculty" or "program chairperson." "Primary responsibility rests with dean but primary work on curricula rests with the faculty." "If the dean is the chief academic officer he has to be involved." How can the dean "capitulate decisions to [an] external party re: course quality?"

Total consensus on dean responsibility for the science related courses was obtained for one of the six statements in the set concerning dean activity (statements 35 through 40), (see Table 19). All agreed that the dean has an administrative role if there is a transfer of funds among colleges or departments (statement 40). Most agreed (80% consensus) on a dean role if the course was limited to allied health students (statement 39). A majority disagreed with a CAH dean role for courses sponsored outside of the college (statements 35 through 38). Eighty percent consensus was reached that the dean not identify faculty (statement 36) or participate in course development (statement 37) for externally sponsored courses.

Most participants disapproved (80% consensus) of a dean role in course development where ever the course was

Table 19

Percent Consensus re: CAH Dean Responsibility for Science Related Courses

	Courses sponsored by CAH Round			non-CAH Round		
Statement	I	II	III	I	II	III
The dean should:						
35 Attract and retain qualified faculty to teach these courses.	--	--	80	--	--	0
36 Identify qualified faculty to teach these courses.	--	--	0	--	--	80D
37 Participate in course development or revisions.	--	--	80D	--	--	80D
38 Have an administrative role in the course delivery under all circumstances.	--	--	0	--	--	0
39 Have an administrative role in the course delivery if the course is limited to allied health students.		NA		--	--	80
40 Have an administrative role in the course delivery if there is a transfer of funds to the other college/department for the course.	--	--	100	--	--	100

Note. D = Disagree.

sponsored (statement 37). The dean "lacks power but can make suggestions." "In reality deans have little to do with the specifics of the curricula so their responsibility is to obtain a faculty that is competent at developing and maintaining a curriculum." One who advocated a dean role stated, "a dean should be in a position to integrate all information all the time."

Within the CAH, most concurred (80% consensus) that the dean has a role in attracting and retaining qualified faculty (statement 35). But when it came to specifically identifying faculty to teach the courses (statement 36) "one should trust their colleagues." "Allied health programs [are] too varied for one person to have enough expertise to identify qualified faculty in all areas."

Other narrative data for statements 32 through 40 indicated that many of the roles are "usually delegated to the chair" or should be. The "dean is ultimately responsible but actual management is delegated to department heads." "We assign to departments the responsibility to administer all interdisciplinary courses." Or "<u>all</u> [emphasis original] should have input but first responsibility should rest with the department faculty." The "chairperson should have final responsibility." Or "the curriculum is the responsibility of the <u>faculty</u>!" [emphasis original].

The specific roles of CAH faculty not teaching science related courses generated considerable agreement (statements 41 through 50). These statements (see Table 20 and 21) were

Table 20

Consensus re: CAH Faculty Responsibility for Science Related Courses by Organizational Structure: Sponsor (S) and Faculty (F)

Statement	CAH S CAH F Round I	II	III	CAH S non-CAH F Round I	II	III	non-CAH S non-CAH F Round I	II	III
College of allied health faculty who are not teaching science related courses should:									
41 Identify faculty to teach these courses.	--	--	0	--	--	0	--	--	100D
42 Have input into the science related course(s) goals - objectives under all circumstances.	--	--	80	--	--	80	--	--	0
43 Have input into the science related course(s) goals - objectives if/when the course is limited to allied health students.	--	100	--	--	--	100	--	--	100
44 Have input into the science related course(s) goals - objectives if/when there is a transfer of funds from the college of allied health to the other college/department.		NA		--	--	100	--	--	80
If and when college of allied health faculty input is warranted the faculty should:									
45 Relay accreditation requirements to the science related course faculty.	100	--	--	100	--	--	--	100	--
46 Relay practice situations which the students are likely to encounter to the science related course faculty.	100	--	--	100	--	--	--	100	--
47 Recommend course goals.	--	100	--	--	100	--	--	--	80
48 Recommend specific course content.	--	100	--	--	100	--	--	--	80
49 Recommend teaching methods.	--	--	0	--	--	80	--	--	100D
50 Recommend course textbooks.	--	00	0	--	--	0	--	--	0

Note. D = Disagree.

Table 21

<u>Round III: Percent Consensus re: Role of CAH Faculty not Teaching Science Related Courses by Organizational Structure: Sponsor (S) and Faculty (F)</u>

S	CAH S CAH F	CAH S non-CAH F	non-CAH S non-CAH F
41	0	0	100D
42	80	80	0
43	100	100	100
44	NA	100	80
45	100	100	100
46	100	100	100
47	100	100	80
48	100	100	80
49	0	80D	100D
50	0	0	0

<u>Note</u>. Note number in left column refers to the statement (S) number. D = Disagree.

posed for each of the science related course organizational structures. For courses sponsored outside of the college most agreed (80 or 100% consensus) that faculty have input if the course is limited to allied health students (statement 43) and if there is a transfer of funds (statement 44). When course input is warranted, 80 or 100% consensus indicated that faculty should relay accreditation requirements (statement 45), relay practice situation requirements (statement 46), recommend course goals (statement 47), and recommended specific course content (statement 48). For CAH sponsored courses 100% consensus was achieved for these statements.

For externally sponsored courses there was 100% consensus that CAH faculty not identify science related course teachers (statement 41). For college sponsored courses, opinions about this statement were mixed. The collective responses to the statements which addressed dean (statements 35 and 36) or faculty (statement 41) responsibility for identification of science related course faculty indicated that participants considered the recruitment of college faculty a dean role. The narrative data indicated that they viewed the identification of faculty to teach specific courses as a department head responsibility. "Faculty may have input, but the . . . decision is up to the department head or dean." Or, "Where is the department head in all of this?"

Most agreed that CAH faculty not teaching science related courses should have input into course goals for CAH sponsored courses (statement 42). Also most agreed that they should recommend goals (statement 44) and specific course content (statement 48) for externally sponsored courses. But a minority disagreed. Allied health faculty may "designate and area e.g., lung pathology but detailed content should be left to the basic science departments." "A basic course . . . should be just that and cover all areas. . . and not [be] directed toward any specific program or student." Among the minority who advocated that CAH faculty recommend teaching methods (statement 49) one wrote that this was pertinent to explain "the way their own students seem to learn best."

Summarized in Table 21 is the role across organizational structures of the CAH faculty who do not teach science related courses. It is evident that their role is expected to be greatest when courses are sponsored by the CAH and taught by CAH faculty. Regardless of organizational structure participants expect these faculty to have input if the course is limited to allied health students (statement 43) and to communicate accreditation requirements (statement 45) and practice situations (statement 46). They are nearly unanimous in agreement that CAH faculty recommend course goals (statement 47) and specific course content (statement 48). But participants

tend to delegate choice of teaching methodology (statement 49) to the individual faculty.

In response to the terminal open-ended question (What other activities should the faculty or dean perform to enhance the delivery of science related courses taught by faculty without a CAH primary appointment?), the theme was communication. Basic science faculty participants asked that they be provided with feedback "from student evaluations," "on how well students do in subsequent classes," or their "performance on state board exams." One participant suggested forums for CAH and non-CAH faculty as "they share a similar purpose and so should communicate regularly". Participants advocated "continuous . . . efforts to keep communication open" and provide "recognition."

In summary, the panel experts believed that the CAH dean had a major role in attracting college faculty but neither dean nor faculty had responsibility to identify faculty for specific courses. The dean was not expected to have a role in course development. CAH faculty were expected to have major input in course content and development regardless of course sponsorship. The exception was that they should not recommend teaching methods.

Summary

Presented in this chapter are the results from the conduct of this study. According to the study design, items

representing external, internal, and intraorganizational elements of Stark's framework have been identified and validated if 100% consensus was reached. Other items have been identified and may be valid if 80% consensus was achieved. In the next chapter these items are synthesized into criteria that can be used to evaluate the delivery system for science related courses for baccalaureate allied health students in academic health centers.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

This study was undertaken to identify and validate criteria that can be used to evaluate the delivery system for selected science related courses. The need for a set of criteria was justified by findings in the literature about the sciences in curricula for students of health professions. Several studies were presented which indicated that relative to the sciences "the quality of the teaching program for students in fields other than medicine continue to present problems for those AHCs with several schools" (AAHC, 1980a, p. 9).

Stark's theoretical framework (Stark et al., 1986) and this study's use of it was explained. Briefly, this framework is an interdisciplinary professional education model encompassing external, intraorganizational, and internal influences which affect programs, the program environments, and expected professional outcomes. The literature review indicated that some of the elements identified by Stark and associates as specific influences were particularly relevant concerning criteria for science course delivery. These included the professional community

knowledge base, accreditation standards, college mission, and faculty characteristics.

A review of CAH catalogs indicated that the colleges did have mission statements and did espouse the teaching, research, and service, missions of their universities and AHCs. From the catalogs it was also found that undergraduate science courses were presented under an array of organizational auspicies. An analysis of 20 sets of specialized accreditation standards revealed that all accreditation agencies required biophysical science course content. These requirements were stipulated in 20 different ways. Some projected a university orientation and others did not.

The environment to which the criteria would apply, colleges of allied health in academic health centers, was explained historically and descriptively. The AHCs were described as complex tertiary entities at the confluence of education and health care. They have a patient service and biomedical research orientation. In this setting the allied health professions and colleges were found to be diverse with many programs but with relatively few faculty or students per program. They are sometimes perceived as immature and dependent relative to medicine and other health professions.

With the need for a set of criteria well established, the theoretical framework explained, and the setting described, the study design was presented in Chapter III.

The seven college participants were selected as leaders of their kind with the assistance of two deans of allied health. The 21 panel experts were deans of these colleges or allied health and basic science faculty selected for their expertise by the respective deans. The role of the panel experts was to participate in a modified Delphi study to identify and validate the criteria. The Delphi technique was explained in Chapter III.

The panel experts were provided with a list of the science related courses unique to their respective institutions. These courses had been identified by the investigator and three others. Each course concerned a biophysical science and was required of students during the professional curriculum. Each catalog course description was judged to fulfill the conceptual competence outcome as defined in Stark's framework. A primary purpose of the course was to develop an "understanding of the theoretical foundations" (Stark et al., 1986, p. 252) of the science necessary for professional practice.

The parameters to evaluate the data from the panel experts were established and described. A minimum of 80% consensus among the participants was needed by the last (third) round for an item to be incorporated into a criterion. In Chapter IV the findings from this study were reported.

Before the inauguration of this study the possibility of a low response rate concerned the investigator. The

instrument took time to complete and strangers would be asked to respond three times during fall term. Disinterest among the deans could have terminated the whole study. But the response rate was good and participation active. The possible reasons for this outcome were an interest about this topic among the panel experts and good homework prior to the first contact with anyone.

Listed in the section following are the criteria that should be used to evaluate the science course delivery system described. Items which are contraindicated will be listed also. Next, selected findings relevant to the criteria and the literature will be discussed. The studies weaknesses will be reviewed followed by recommendations for implementing the criteria. Finally suggestions for further research and the use of Stark's framework for allied health professional education research will be proposed.

Criteria

The criteria recommended to evaluate science related course delivery systems have been synthesized from the panel expert data presented in Chapter IV. They are applicable for baccalaureate allied health students in academic health centers. Criteria are recommended for adoption or consideration if 100% or 80% consensus was achieved respectively. Some potential criteria received a negative consensus. These are listed as criteria not to employ or requiring further justification. All statements which

should or should not be used as criteria are listed under each applicable research question.

Research question number one: What professional and academic qualifications should science related course faculty have?

Qualifications for all science related course faculty.

Criteria to adopt:

Science related course faculty should

1. Have a primary faculty appointment in some specific unit of the university.

2. Demonstrate effectiveness teaching undergraduate allied health students.

3. Show evidence of research or scholarship.

4. Hold a graduate degree in the same or closely related science of the science to be taught.

5. Graduate students are acceptable as science related course faculty assistants for CAH undergraduates.

Criteria to consider:

Science related course faculty should

6. Show evidence of periodic continuing education.

7. Have a doctoral degree.

Criteria not to employ or requiring further justification:

A. Faculty rank.

B. Tenure status.

C. Health professional credential.

D. Graduate students as full-fledged faculty (teachers of science related courses).

Research question number two: In what roles should science related course faculty engage? Roles for science related course faculty--regardless of course sponsor or faculty appointment. Criteria to adopt:

Science related course faculty should

8. Participate in collegial dialogue with other college/program faculty about proposed or revised course goals, objectives, and methods.

9. Set course goals.

10. Choose teaching methods.

11. Develop course objectives, course syllabi, and select textbooks.

12. Expect student course evaluation.

13. Conduct basic or applied research.

Additional criteria to adopt for all science related course faculty when the course(s) is/are sponsored by the CAH:

Science related courses faculty should

14. Participate in program accreditation activities.

15. Participate in allied health curriculum planning.

Additional criterion to adopt for all science related course faculty with a primary CAH appointment:

Science related course faculty should

16. Provide academic counseling relative to the course(s) taught.

Research question number three: What role should the college of allied health dean and faculty have in the evaluation of science related course faculty who do not have

primary appointments in the college? Role of the CAH dean in the evaluation of non-CAH science related course faculty. Criteria to adopt:

17. The dean has academic and administrative responsibility for the integrity of all science related courses sponsored by the dean's college.

18. When the dean has academic or administrative course responsibility the dean should also have responsibility to evaluate the science related course faculty.

19. Dean's responsibility to evaluate science related course faculty may be exercised directly or delegated.

CAH evaluation of non-CAH science related course faculty, teaching CAH sponsored or required non-CAH sponsored science related courses. Criteria to adopt:

College of allied health evaluation should

20. Occur.

21. Address all expectations the CAH has of the faculty member.

Criteria to propose that the other college adopt:

22. Results of the CAH evaluation should affect merit raise, tenure, and promotion decisions made by the science related course faculty members primary department.

Research question number four: What control should the college of allied health faculty and dean have upon the delivery and content of science related courses? Control of

the CAH dean related to the delivery and content of science related courses.

Criteria to adopt:

The college of allied health dean should

28. Attract and retain qualified faculty to teach science related courses sponsored by the CAH.

29. Have an administrative role in the science related course delivery if there is a transfer of funds between colleges/units.

30. Have an administrative role in the science related course delivery if the externally sponsored course is limited to allied health students.

Criteria not to employ or requiring further justification for use:

E. Dean participation in science related course development or revisions, regardless of college sponsor.

F. Dean identification of specific faculty to teach specific science related courses.

Research question number four: What control should the college of allied health faculty and dean have upon the delivery and content of science related courses? Control of CAH faculty who do not teach science related courses upon the delivery and content of science related courses.

Criteria to adopt:

CAH faculty who do not teach science related course should

31. Participate in collegial dialogue with science related course faculty to recommend science related course goals and objectives if the science related course is CAH sponsored, <u>or</u> limited to allied health students, <u>or</u> there is a transfer of funds between units.

32. Relay accreditation requirements to science related course faculty.

33. Relay practice requirements to science related course faculty.

Criterion to consider:

CAH faculty who do not teach science related courses should

34. Participate in collegial dialogue with any science related course faculty to suggest goals and objectives--unless circumstances to the contrary are established.

Criteria not to employ or requiring further justification:

CAH faculty who do not teach science related courses should

G. Recommend teaching methods.

H. Identify faculty to teach science related courses.

Discussion

Individual professionals, like the panel experts in this study, may indeed believe that the profession's biophysical science knowledge base is agreed upon (statements 01 and 01A). But the literature support for this is inconclusive. In solitude, perhaps each is certain of the knowledge base. But when three or more convene, as shown in the minutes of curriculum committees, there is far less consensus on content. Licensure boards, certification agencies, and testing companies face the challenges of justifying that their screening devices (examinations) do test the knowledge needed for professional practice. If and when the knowledge base is known it is probably best to recognize it as dynamic.

Participants were nearly unanimous that professional faculty need not be qualified to teach each science related course (statements 04 and 04A). This may imply a transfer of the arts and sciences model: A botanist does not teach entomology to juniors even though a botanist and entomologist both may teach general biology. Also, it may indicate a belief that basic science rather than professional faculty should teach the science related courses. Whatever the reasons, the finding is the antithesis of those who believe that professional faculty "should be able to cover <u>any</u> [emphasis added] area of the entry level curriculum" (Covey & Burke, 1987, p. 4).

Unlike all profession specific accreditation standards examined, these criteria are not intended to be used to identify course content. Each criterion (1 through 34) is sufficiently broad based to apply across any AHC baccalaureate CAH program. University issues, faculty appointment (criterion 01), research expectations (criterion 03), and the role of graduate students (criterion 05) are addressed. Compared with many sets of accreditation standards, the role of the administrator in the course delivery system is more specific. The administrator is a dean and the criteria (17, 18, 19, 28, 29, and 30) state responsibilities the dean should have.

Current practice indicates that both allied health and basic science faculty are capable of and do teach science related courses. Accreditation standards usually itemize required professional but not basic science faculty qualifications. Yet most panel experts did not think that science related course faculty needed professional credentials. Whatever the initial faculty background the criteria do not discriminate between basic science or professional faculty. Many faculty expectations are the same (criteria 8 through 13). Where there are different expectations they are contingent upon course sponsor or faculty appointment (criteria 14 through 16).

Senior faculty and tenure status were unanimously rejected as criteria for faculty qualifications. Why is

this, when the AAHCs governance study authors published that nonmedical health center students "insist they get second class [science] instruction, frequently from junior faculty or less experienced and less qualified faculty" (AAHC, 1980b, p. 92)? Maybe some traditional measures (academic or accreditation) of faculty expertise are not perceived as germane in this situation. How can an institution help insure that faculty communicate the science conceptual competence needed by undergraduate allied health students? Maybe in this case the more qualified, senior faculty are those who meet criteria 1 through 5.

In the interest of instilling positive attitudes toward the health care team concept, cost-effectiveness, credit transferability, or quality many advocate the use of externally sponsored courses for allied health students. The experts in this study concur that there should be fewer expectations of science related course faculty who teach externally sponsored courses or who are not primary CAH appointees. What are the implications for CAH faculty workload regarding curriculum planning, accreditation self-studies, and academic advising when critical portions of the curriculum are taught by external faculty? Some would argue that vital aspects of many allied health curricula are already taught by external faculty, for example, clinical practicum. How much delegation is enough?

It was surprising that panel experts did not want external faculty to provide academic counseling to CAH

students in relation to their own courses (statement 17, criterion 16). This could imply a recognition of different priorities for faculty of different colleges. It may also be a matter of campus geography. Also it may be a manifestation of a preference to take care of one's own students or a lack of trust or knowledge about the external faculty. It would be interesting to explore the reasons for fewer expectations of non-CAH faculty.

Panel experts did expect course evaluation no matter what the faculty status (criteria 20 and 21). Also the participants did accord considerable input by college faculty who were not teaching science related courses (criteria 31 through 34). Panel experts did not expect the deans to participate in actual course development. Nor did experts expect the dean or faculty to identify specific science related course faculty. The assumption is that this is a department chairperson duty. Is faculty recruitment and course assignment exclusively a dean or chairperson responsibility? If CAH faculty participated more in faculty recruitment, identification, and assignment perhaps they would trust the others to provide academic course advising or determine detailed course content.

Weaknesses

This study relied on expert opinion, the criticisms of which were discussed in Chapter III. The topic was

interdisciplinary and the analysis qualitative. While not weaknesses of themselves the biases toward specialization and quantitative analysis are acknowledged. Stark's framework is broad. However this investigator found it to be a workable model for a study of this kind.

There were three specific weaknesses for which the investigator accepts direct responsibility. First, opinions of students or practicing professionals were not sought. Those who would be affected by science course delivery system criteria should contribute to criteria development. If a CAH faculty were to consider the use of these criteria, representative students should participate in the prerequisite deliberations.

The statements about academic counseling may have been unclear. Therefore the criteria and discussion on this issue may be invalid. Some did not or had difficulty enumerating the choices listed for the ranking statements. These concerned a ranking of curricula responsibility (dean, faculty, and accreditation) and a ranking of the important sources in establishing faculty professional and academic credential requirements (university mission, college mission, and accreditation). Others indicated that the choices should not be mutually exclusive. However, no one mentioned that the choices provided were unimportant or inappropriate. Also no one suggested any new item.

Lastly--preliminary to this study--the identification of the science related courses by one allied health expert

was incongruent with the opinions of the others. This person's votes were disregarded. The justification was that he/she did not follow the directions. It was suggested that professional "turf guarding" was operant. A study can be designed to test this (see p. 208).

Implementation of the Criteria

The criteria identified in this study address the qualifications, roles, and evaluation of CAH-AHC science and professional faculty under different organizational structures. It is unlikely that any CAH would or should adopt these criteria: Only 21 panel experts in 7 colleges directly contributed to their development. However, faculty and administration of a CAH could decide by committee or their own Delphi which of these criteria to adopt and if so how each would be measured. Thus their criteria would be based on this multi-college external study, reviewed internally, imposed from within, and monitored from within.

The same procedure could be followed to modify these criteria for application in community colleges, non-health center 4-year colleges, and graduate entry level programs. They could be revised for use by other health professional colleges. An accrediting agency with multiple constituents, such as CAHEA, could review the criteria for applicability as standards to serve across multiple programs.

Recommendations for a CAH to Adopt the Criteria

If a CAH faculty and administration were to consider the adoption of the criteria identified and validated by this study the following recommendations are offered.

1.1 Dean should appoint a college-wide committee of five or more persons to recommend criteria and measures to adopt to evaluate the colleges science related course delivery system.

or

1.2 Chairperson of an ongoing college-wide [academic affairs] committee should appoint a subcommittee of five persons to recommend criteria and measures to adopt to evaluate the colleges science related course delivery system.

2. Either the dean appointed or college-wide committee may have to include basic science faculty or administrators from outside of the college. This would vary with the institution and the nature of the appointments of those currently teaching science related courses.

3. In order to avoid bias the science related courses should be identified essentially as they have been for this study; using catalog course descriptions and Stark's definitions as guidelines for interpretation. The evaluators should be basic scientists and health professionals who do not teach allied health students.

4. Committee should conduct an internal modified Delphi study among CAH faculty, selected students, administrators, practitioners, and basic scientists regarding the proposed criteria and measures.

5. Initially the proposed criteria should be those recommended by this study but the measures would be unique to the institution.

6. Committee should review the internal data and recommend college-wide criteria and measures, to department chairpersons and dean.

7. Dean and department chairpersons should agree on implementation of an evaluation cycle for criteria and measures to evaluate the colleges science related course delivery system. Exceptions, if any, should be agreed upon in advance.

The usefulness of the study is not just the identification and potential use of the criteria. Some of the study's weaknesses, extraneous findings, and criteria deserve further study. The practical and research potentials for Stark's framework in allied health education are multiple.

Suggestions for Further Research and Practice

One of the extraneous findings of this study, the disparity of opinion of the allied health expert about the science related courses needs testing. Can Stark's

framework and course descriptions be used objectively to identify discreet primary professional outcome competencies? If so it might help clarify what is meant by basic, applied, professional, bridge, clinical, or fundamental sciences (Thier, 1987).

Fifty tentative science related course descriptions could be perused by allied health and basic science faculty from institutions different from the colleges providing the descriptions. For half of each faculty group the descriptions would be labeled science related and for the other half professional science. The null hypothesis would be that there is no difference in faculty identification of course descriptions with the different titles. If for example, the allied health faculty identify significantly more descriptions as professional science than science related this would be evidence of bias.

In lieu of formal implementation of any criteria, performance of faculty who do and do not meet selected criteria could be compared. Does a difference in student outcome measures, such as biophysical science board scores correlate with science related course faculty qualifications? This study might be program or discipline specific and control for student grade point averages.

Prior to the development of the instrument a decision was made not to single out the department chairpersons. But some participants indicated specific roles for the

department chairperson. Others implied that the study would be incomplete without specifically designating a role for the chairperson. Another study could be to investigate the academic and administrative role of the department chairpersons concerning course delivery. Activities that are or are not shared with other faculty or deans could be determined. It or any allied health chairperson study should be designed to control for the actual occupation of the department chairperson.

By definition the deans are the chief academic officers of their colleges. The identification of roles of CAH deans or assistants in academic affairs, including curriculum development, could be compared with the academic activities undertaken by other health professional college deans. Do faculty expectations for and dean academic activities differ when the dean is not a member of the profession?

Relatively excessive time in administrative activity by CAH faculty without administrative appointments has been reported. Would the use of more externally taught courses parallel more faculty or chairperson time spent in administration (for these courses) rather then teaching or research associated with the content? A study could be designed to correlate program faculty or department chairperson activity with the number of externally taught courses.

The attitudes about and practices of academic advising among CAH faculty deserve further investigation. The

nonconsensus, nonresponses, varied remarks, and finding that most concurred on no academic advising role by external faculty should be explored. Do students' academic advising needs differ by course sponsorship or faculty appointment?

Stark's framework and the Delphi method could be employed as it has been in this study but to identify criteria for the delivery of clinical courses. Participants might include faculty, practitioners, college and agency administrators, and students. The agencies and programs could be specific (hospital only) or not. The resulting criteria could be used to determine if a given site is acceptable for student clinical experience or who is eligible for an adjunct appointment.

At clinical sites the utility of these criteria could be tested. Students could be assigned randomly to agencies which do and do not meet the selected criteria. Selected outcomes could be measured prior to and after the clinical rotation. Then comparisons could be made.

If certain professional outcomes, as conceptualized and defined by Stark and associates, are found or perceived deficient in a program or programs, faculty might identify in what other courses these competencies might be reinforced. Two allied health curricula outcomes now in vogue are the competency, interpersonal communication and the attitude, a scholarly concern for improvement (see pp. 9 and 10). Such outcomes, if deemed necessary, are not learned in one course or during one semester.

Stark's framework can be used to identify professional preparation outcomes that are unique or shared among allied health programs. Which courses are or are not appropriate to share among programs? "What programs have similar professional preparation environments?" (Stark et al., 1987, p. 558). Knowledge of this could be used to decide which programs belong in what departments or which programs might cooperate in evaluation or self-studies. By using outcome and environment as conceptualized in the Stark framework these questions are answered in part by the theoretical base necessary for practice and not administrative fiat.

Conclusion

To answer the research questions the literature review indicated that certain elements (influence) of Stark's framework were particularly cogent. These included the professional knowledge base (external influence), accreditation standards (external influence), mission (intraorganizational influence), program interrelationships (intraorganizational influence), faculty background and evaluation (internal influences), and curricular tensions (internal influences). The professional preparation outcome, conceptual competence, as defined by Stark et al. (1986) provided the basis for the identification of the science related courses.

The purpose of this study has been attained and presented. The criteria have been identified and validated

by a small national group of CAH faculty and administrators. Recommendations to implement the criteria have been suggested. This report has concluded with suggestions for further research.

APPENDIX A

CATALOG REQUEST LETTER

UF COLLEGE OF EDUCATION
University of Florida
Gainesville, Fla. 32611

INSTITUTE OF HIGHER EDUCATION
229 Norman Hall
September 15, 1986

Office of the Registrar
The University of Alabama at Birmingham
University Station
Birmingham, Alabama 35294

Dear Sir:

Please send me one copy of your current catalog which describes baccalaureate level allied health programs of your allied health college/school.

I am doing a study which concerns academic health centers that have colleges or schools of allied health professions. For this I need a paper catalog. Please notify me if there is any charge.

Yours truly,

Zolika Heath

Zolika Heath
Graduate Research Assistant

APPENDIX B

CATALOG REQUEST FOLLOW-UP LETTER

UF COLLEGE OF EDUCATION
University of Florida
Gainesville, Fla. 32611

INSTITUTE OF HIGHER EDUCATION
229 Norman Hall
October 14, 1986

University of Connecticut Health Center
School of Allied Health
Farmington, Connecticut 06032

Dear Sir:

Please send me one copy of your current catalog which describes baccalaureate level allied health programs of your allied health college/school. If this catalog does not contain your school wide mission (purpose, goals, or objectives) would you also send a copy of your mission statement?

I am doing a study which concerns academic health centers that have colleges or schools of allied health professions. For this I need a paper catalog. Please notify me if there is any charge.

Yours truly,

Zolika Heath

Zolika Heath
Graduate Research Assistant

APPENDIX C

COLLEGE NOMINATOR REQUEST LETTER

UF COLLEGE OF EDUCATION
INSTITUTE OF HIGHER EDUCATION
229 Norman Hall
University of Florida
Gainesville, Fla. 32611

April 1, 1987

Dr. Keith D. Blayney, Ph.D.,
Dean and Professor
School of Community and Allied Health
University of Alabama at Birmingham
Birmingham, AL 35294

Dear Dr. Blayney:

It was nice talking to you today. Thank you for agreeing to help select the participating colleges for this study. As I mentioned the purpose of the study is to establish criteria using Stark's framework, which can be used to evaluate the delivery system for science related courses for baccalaureate allied health students. The need for the study is justified by a review of the literature, a content analysis of 51 sets of correspondence (catalogs, brochures) from academic health center based colleges and schools, and a review of 20 sets of specialized health related accreditation standards plus the SAAHD/AHC collegewide standards. The proposal has been accepted by my committee.

To conduct this study ten to fifteen deans and two to four faculty per school will be contacted. But first I need to identify fifteen leading colleges/schools of allied health (10 plus 5 alternates). I proposed to accomplish this by the use of preselected criteria and expert opinion. The initial population of 60 has already been reduced to 30. UAB and UF meet the criteria, but since you and Dr. Gutekunst are contributing expert opinion neither college is included in the list. This should not be too time consumming.

Turn the page and you are ready to start.

Cordially,

Zolika Heath

Zolika Heath

APPENDIX D

INSTRUMENT TO NOMINATE COLLEGES

Purpose: To identify 15 leading colleges of allied health.

Definition: Leading colleges of allied health are those among this list that you believe are outstanding colleges. The faculty and administration should have a commitment to baccalaureate allied health education and a probable interest in participating in this study.

Background: The following 30 colleges/schools of allied health a) are part of health centers that belong to the Association of Academic Health Centers (60), b) responded to the investigators request for a college catalog (51), c) Have three or more baccalaureate programs and, d) have an independent or dependent college structure i.e. not the coordinated arrangement (30).

Directions:

1. Peruse the preceeding list. You may want to eliminate some but be sure to select others [Deleted from this document].

2. In making your choices consider the college as a whole, specific programs and the university are important but secondary.

3. Several colleges are listed more than once, but only choose a college once. The number immediately after the name of the college indicates how frequently it is listed, do not be influenced by this number to choose or not choose a college.

4. In order to insure a balance of control, structure, and program diversity, you are asked to make your selections within the information sets that will follow.

5. Indicate your opinion of the leading college(s) in the following information sets by putting a check in the box to the right.

1. Five colleges are private. Select one.

   Five colleges were listed. [ ]

2. Six colleges have a dependent structure i.e. they are part of medicine or pharmacy. Select one.

   Six colleges were listed. [ ]

Go to the next page.

3. Eight colleges have a dietetic program. Select one.

   Eight colleges were listed. [ ]

4. Ten colleges have a physician assistant program. Select two.

   Ten colleges were listed. [ ]

5. Twelve colleges have radiologic technology programs. Select two.

   Twelve colleges were listed. [ ]

6. Ten colleges have critical care related programs. Select two.

   Ten colleges were listed. [ ]

7. Thirteen colleges have six or more baccalaureate programs. Select two.

   Thirteen colleges were listed. [ ]

8. You should have selected eleven colleges. Please go back and choose any four additional leading colleges. And don't forget to consider the two that were not among the previous groupings.

   Two colleges were listed. [ ]

Thank you. That is all.

PS The 10 colleges to receive the most votes among three experts will be asked to participate in this study. Please return this in the enclosed stamped self addressed envelope.

APPENDIX E

LETTER TO PRELIMINARY EXPERTS

May 11,1987

John C. Gudat, Ph.D.,
Assistant Professor
Department of Medical Technology
University of Florida
Gainesville, FL 32611

Dear Dr. Gudat:

Thank you for agreeing to serve as a pilot expert, to help establish criteria, using Stark's framework, which can be used to evaluate the delivery system for science related courses for baccalaureate allied health students. As we will have discussed, your assistance will be needed to a) identify science related courses offered by the participating colleges and b) critique proposed criteria for the delivery system for these courses. This will probably take a few hours of your time during the next few weeks.

In my proposal, I justify the need for such a study by a review of the literature, a content analysis of 51 sets of correspondence (catalogs, brochures) from academic health center based colleges of allied health, and a review of 20 sets of specialized health related accreditation standards. In essence science related topics are required in the allied health curricula, mandated in a variety of ways by the accrediting agencies, and often beset by delivery system (administrative/ organizational) problems.

Attached is Pilot Expert Packet I, the first of two. It includes a reprint of Stark's (1986) article, guidelines for identifying science related courses, and several course descriptions from participating colleges of allied health. Pilot Expert Packet II will contain a list of science related courses which will have been identified for the College of Health Related Professions-UF, and proposed criteria which can be used to evaluate the delivery system for these courses.

Thank you for your suggestions and time associated with this study.

Sincerely yours,

Zolika Heath

Zolika Heath
392 0745
375-0282

APPENDIX F

GUIDELINES TO IDENTIFY SCIENCE RELATED COURSES

GUIDELINES TO IDENTIFY SCIENCE RELATED COURSES

Purpose: To establish content validity of course descriptions tentively identified as basic or applied biophysical sciences in allied health curricula.

Background: The researcher, Stark (1986) has developed a framework for the study of professional education. She specifies and operationally defines six competencies and five attitudes which students of any profession need to acquire in order to practice. One of these is conceptual competence i.e., "an understanding of the theoretical foundations" (p. 252) necessary for professional practice. Another is integrative competence, the ability to integrate theory and practice.

Each course description which you will read 1) is required for students of one or more baccalaureate allied health program during the professional phase and 2) has the name of a science (biochemistry, embryology, physics . . .) in the course title. As you read each course description

Include as science related:
1) Those that imply the development of conceptual competence as a major goal.
2) Those that imply biophysical science content in whole or in part.
3) Integrative competency may or may not be a goal.

Do not be influenced by:
1) Course level - Include both elementary and advanced courses.
2) Scope - Apparent breadth is not important, rather the competence to be developed is.
3) Specific science - Any biophysical science topic is appropriate.
4) Specific health profession - Include courses which seem designed for any specific health profession or several.
5) Basic or applied science - Include both.

Exclude as science related:
1) Those which emphasize technical skills, clinical practice, or the "how to's" of the occupation.

Directions: Please read the following course descriptions. Put a check in the appropriate box in the right column to indicate if the course description fulfills the requirements for classification as a basic or applied biophysical science related course. If you are not sure check the last column, headed by a question mark (?).

P L E A S E   G O   T O   T H E   N E X T   P A G E

APPENDIX G

INSTRUMENT TO IDENTIFY SCIENCE RELATED COURSES

Course Descriptions	Science Related		
	Yes	No	?
01-08 A study of the basic principles of living tissue. Emphasis is placed on structural and functional relationships with the needs of the <u>occupation</u> in mind.	[ ]	[ ]	[ ]
01-09 A Study of the development of the form of the human body emphasizing structural and developmental relationships between the musculoskeletal and nervous systems.	[ ]	[ ]	[ ]
01-10 A study of the basic structural and functional aspects of the human nervous system. Clinical phenomena are introduced for the purpose of promoting understanding of function and relating the subject to the practice of physical therapy.	[ ]	[ ]	[ ]
01-11 A survey of the electronic principles of medical and clinical instrumentation; intended as an undergraduate introductory core course for <u>name of several occupations</u> to the field of electronic instrumentation. Topics include electronic fundamentals, instrumentation design theory, transducers, trouble shooting, and microprocessor applications. Recitations and laboratory sessions are designed to accommodate specific disciplines in allied health.	[ ]	[ ]	[ ]
01-12 This course emphasizes pathology as demonstrated on the radiographic film in order to determine optimal positioning and radiographic techniques. The physiology and pathology which are recorded by the radiographic image, and factors which influence the radiologist's diagnosis, therapy, and prognostic impression are also included.	[ ]	[ ]	[ ]
01-13 The course is designed to advance the students' knowledge and understanding in the physical principles of diagnostic radiology. New applications and recent advances in radiation physics will be discussed.	[ ]	[ ]	[ ]

APPENDIX H

INVITATION TO DEANS

UF COLLEGE OF EDUCATION
University of Florida
Gainesville, Fla. 32611

September 1,1987

Thomas C. Barker, Ph.D., Dean
School of Allied Health Professions
Medical College of Virginia
P O Box 233
Richmond, VA 23298-0233

Dear Dean Barker:

The School of Allied Health Professions that you lead has been nominated as a representative of excellence in allied health education by a panel of allied health educational leaders. Deans Gutekunst and Blayney of the Universities of Florida and Alabama-Birmingham have participated in this nomination. You represent one of 10 chief administrators of allied health who are being asked to participate in this study. The purpose is to gain consensus on statements concerning the delivery system for selected courses for baccalaureate allied health students.

This is a request for your opinions and judgments about the delivery systems in place for the applied and basic biophysical science components of baccalaureate allied health programs. You are being asked to verify the generic programs for which your School grants a degree and respond to a set of statements concerning the delivery system for selected courses. For the latter, a closed Delphi technique will be used to solicit and collate informed judgments and feedback.

I will telephone you on September 10, to answer questions you may have. After our phone conversation, if you are able to participate, I will ask you to verify the baccalaureate programs and nominate four faculty participants. The enclosures should then be returned in the stamped self-addressed envelope.

Your participation will be requested a maximum of three times. Altogether it should take 40 minutes or less of your time. Your judgments on the first round will be tabulated and collated with those of others. You will be provided with the results and comments of the others on the second mailing. The final round will contain consensus items and a summary of additional comments and issues raised by other panel experts. The source of all opinions will remain ANONYMOUS for each person and all institutions.

I hope you will elect to participate. Your opinions are highly valued and greatly appreciated. Thank you for your cooperation.

Sincerely yours,

Zolika Heath

Zolika Heath
Research Assistant
Institute of Higher
Education

APPENDIX I

LETTER OF ENDORSEMENT

DEPARTMENT OF COMMUNITY HEALTH AND FAMILY MEDICINE

COLLEGE OF MEDICINE
UNIVERSITY OF FLORIDA
(904) 392-4321

BOX J-222, MSB
J. HILLIS MILLER HEALTH CENTER
GAINESVILLE, FLORIDA 32610

July 17, 1987

Dr. James L. Wattenbarger
College of Education
University of Florida
229A Norman Hall

Dear Dr. Wattenbarger:

I have discussed Ms. Heath's dissertation with her on two occasions and have reviewed her summary of the first three chapters. I support her committees endorsement of the study.

The varied specialized and unique nature of the applied and basic biophysical sciences in the curricula of health sciences is well known. Ms. Heath's study will further the basic goals for allied health education, namely communication, collaboration, and cooperation.

Sincerely,

Darrel J. Mase

Darrel J. Mase, Ph.D.
Adjunct Professor
Dean, College of Health
Related Professions,
University of Florida, 1958-71

APPENDIX J

FORM TO NOMINATE FACULTY

BACCALAUREATE ALLIED HEALTH PROGRAMS
SCHOOL OF ALLIED HEALTH PROFESSIONS
VIRGINIA COMMONWEALTH UNIVERSITY

Are all of the following generic programs sponsored by your School? Please delete programs without currently enrolled students and make any additions.

Long-term & Health Care Mgt.	Physical Therapy
Medical Technology	Radiologic Tech. ed. & adm.
Occupational Therapy	Radiologic Tech. nuc. med.
Medical Record Administration	

____
please initial if correct

Please recommend 4 faculty to participate in this study.
Criteria for all four:

1. Each must teach baccalaureate level allied health students [any program(s)] in the classroom.
2. Each should teach or be familiar with at least one of the courses listed on Enclosure 2.

Criteria for 2 faculty - allied health:

1. Have a full time primary faculty appointment in the School of Allied Health Professions.
2. Have a health professional credential. To avoid relative over representation of medical technology, occupational therapy, and physical therapy, please recommend at least one of the two from any other health profession except these three.

____________________ name	____________________ health profession
____________________ name	____________________ health profession

Criteria for 2 faculty - basic science:

1. Have a full time primary faculty appointment in any college of the university.
2. Have a graduate, preferably doctoral degree in a biophysical science discipline.

____________________ name	____________________ science discipline
____________________ name	____________________ science discipline

Enclosure 1

APPENDIX K

INVITATION TO ALLIED HEALTH FACULTY

UF COLLEGE OF EDUCATION
University of Florida
Gainesville, Fla. 32611

September 23, 1987

Donna Odom M.S., Associate Professor of
Medical Technology
School of Allied Health Professions
Medical College of Virginia Box 583
Richmond, VA 23298-0233

Dear Ms. Odom:

Dean Barker has identified you from among several faculty who teach baccalaureate allied health students from the School of Allied Health Professions. He has indicated that you have a probable interest in participating in this study.

The purpose is to gain consensus on criteria which can be used to evaluate the delivery system for selected courses for baccalaureate allied health students. Participating institutions have been selected because they are academic health center based and are recognized as leaders in the education of health professionals. You have been recommended as a health professions faculty representative, because of your contributions to the School and your profession.

This is a request for your opinions and judgments about the delivery systems in place for the applied and basic biophysical science components of baccalaureate allied health programs. A closed Delphi technique will be used to solicit and collate informed judgments and feedback.

Your participation will be requested a maximum of three times. Altogether it should take 40 minutes or less of your time. You will be provided with the results and comments of the others on the second mailing. The final round will contain consensus items and a summary of additional comments and issues raised by other panel experts. The source of all opinions will remain ANONYMOUS for each person and all institutions.

I hope you will elect to participate. As a basic scientist, who teaches allied health students your opinions are respected, highly valued, and requested at this time. When you are ready to begin or if you would like more information please open the packet.

Thank you for your cooperation.

Sincerely yours,

Zolika Heath

Zolika Heath
Research Assistant
Institute of Higher
Education
(904) 392 0745

APPENDIX L

INVITATION TO BASIC SCIENCE FACULTY

UF COLLEGE OF EDUCATION
University of Florida
Gainesville, Fla. 32611

September 23, 1987

E. Roth Allen, Ph.D., Associate Professor of Anatomy
Louisiana State University
1100 Florida Ave.
New Orleans, LA 70119

Dear Dr. Allen:

Dean Abadie has identified you from among several faculty who teach baccalaureate allied health students from the School of Allied Health Professions. He has indicated that you have a probable interest in participating in this study.

The purpose is to gain consensus on criteria which can be used to evaluate the delivery system for selected courses for baccalaureate allied health students. Participating institutions have been selected because they are academic health center based and are recognized as leaders in the education of health professionals. You have been recommended as a basic science faculty representative, because of your contributions to the School and your biophysical science background.

This is a request for your opinions and judgments about the delivery systems in place for the applied and basic biophysical science components of baccalaureate allied health programs. A closed Delphi technique will be used to solicit and collate informed judgments and feedback.

Your participation will be requested a maximum of three times. Altogether it should take 40 minutes or less of your time. You will be provided with the results and comments of the others on the second mailing. The final round will contain consensus items and a summary of additional comments and issues raised by other panel experts. The source of all opinions will remain ANONYMOUS for each person and all institutions.

I hope you will elect to participate. As a scientist, who teaches allied health students your opinions are respected, highly valued, and requested at this time. When you are ready to begin or if you would like more information please open the packet.

Thank you for your cooperation.

Sincerely yours,

Zolika Heath

Zolika Heath
Research Assistant
Institute of Higher
Education
(904) 392 0745

APPENDIX M

ROUND II COVER LETTER

UF COLLEGE OF EDUCATION
University of Florida
Gainesville, Fla. 32611

October 26, 1987

Thomas C. Barker, Ph.D., Dean
School of Allied Health Professions
Medical College of Virginia
P. O. Box 233
Richmond, VA 23298-0233

Dear Dean Barker:

Thank you for your time and thoughtful response to the statements on science related courses and allied health.

I am pleased to report the participation of deans and faculty from seven academic health center based colleges of allied health. Eighty-seven percent of the individuals who were asked to participate have done so. The panel experts, of which you are one, represent diverse health professions and biophysical disciplines.

This is the second round of this three round study. Packet II contains the cumulative results from the first round including your written contributions. The results are accompanied by the statements, old, new, or revised for you to judge on this round. It makes the packet thicker, but you can compare your individual opinions with the panel's as you proceed.

Recall that the purpose is to gain consensus on criteria which can be used to evaluate the delivery system for science related courses for baccalaureate allied health students. Typically, on the second round consensus increases for many items but contrasting views become more pronounced for others. You may want to change your vote or state your case for a minority view. You will receive the results of this round to include; the cumulative responses, your individual vote, and a summary of all written contributions.

Thank you for your time and continued participation. I have found your comments invaluable and they are greatly appreciated.

Sincerely yours,

Zolika Heath

Zolika Heath
Research Assistant
Institute of Higher
Education
(904) 392-0745

APPENDIX N

ROUND III COVER LETTER

UF COLLEGE OF EDUCATION
University of Florida
Gainesville, Fla. 32611

November 25, 1987

Thomas C. Barker, Ph.D., Dean
School of Allied Health Professions
Medical College of Virginia
P. O. Box 233
Richmond, VA 23298-0233

Dear Dean Barker:

Thank you for your continuous participation in this study, and welcome to the third and final round.

Packet III containes the narrative contributions from all participants of the first two rounds and your vote on each item from the previous round. Consensus has been reached on 31 items.

During this round it is important to obtain your final vote on each item. Also if you have an opinion about an item or another panel members contribution(s) that you have not expressed earlier, please do so. If you believe there have been omissions, please mention this.

Again thank you for your persistance and your time associated with this study. Also thank you for nominating the faculty participants. If you so indicate, you can expect the summary results in January.

Sincerely yours,

Zolika Heath

Zolika Heath
Research Assistant
Institute of Higher
Education
(904) 392-0745

APPENDIX O

INSTRUMENT TO DEVELOP CRITERIA

SCIENCE

AND

ALLIED HEALTH

THE PURPOSE OF THIS STUDY IS TO GAIN CONSENSUS ON CRITERIA WHICH CAN BE USED TO EVALUATE THE DELIVERY SYSTEM FOR SCIENCE RELATED COURSES.

ROUND III

THANK YOU

PLEASE RETURN BY ___________ TO:
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INSTITUTE OF HIGHER EDUCATION
229 NORMAN HALL
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GAINESVILLE, FL 32611

DEFINITIONS FOR THIS STUDY

COLLEGE OF ALLIED HEALTH (CAH) - Umbrella term for all colleges, schools, and divisions of allied health. "College" refers to such a unit.

DEAN - The chief academic and administrative officer of the college, school, or division of allied health.

DELIVERY SYSTEM - Elements such as faculty, fiscal resources, locus of control, and organizational structure which are antecedent to the presentation of any course.

SCIENCE RELATED COURSE - Selected basic and applied science or professional subjects which allied health students take during enrollment in the professional phase of their programs.

SCIENCE RELATED COURSES
VIRGINIA COMMONWEALTH UNIVERSITY[a]
SCHOOL OF ALLIED HEALTH PROFESSIONS

	MED	TECH	COURSE	P.
01-01	MET	303	Parasitology	107
01-02	MET	311-312	Biochemistry	107
	OT			
01-05	BIO	429	Neuroanatomy	118
01-06	BIO	465	Functional Human Anatomy	118
	PT			
01-07	PHT	301-302	Functional Anatomy	129
01-08	PHT	303	Microscopic Anatomy	129
01-09	ANA	403	Embryology	92
01-10	PHT	307-308	Functional Neuroanatomy	129
	RAD	TECH		
01-13	CRS	309	Physics for Radiation Sciences & Ultrasound	114
01-14	CRS	419	Physics for Nuclear Medicine & CT	115
01-15	CRS	310	Application of Physical Principles in Radiation Sciences & Ultrasound	114

[a] The courses listed on this page are unique to this university. The first column lists the investigator designed numbering system. The second column indicates the program and the university course prefix. The last column indicates the catalog page number on which each course description can be found.

BACKGROUND

The list of courses on the previous page have been identified by basic scientists and health professionals as fulfilling prescribed criteria. In many respects these courses are extremely diverse (science discipline, health profession, sponsoring college/department, or responsible faculty). However, each is required in the professional curriculum of one or more programs and each places an emphasis on the applied or basic sciences. For the purposes of this study these courses will be referred to as "science related".

Perusal of the literature and dozens of CAH catalogs indicate that these courses are typically delivered under one of three organizational arrangements.

1. CAH sponsored courses & CAN faculty taught - Sponsored by the college of allied health or any of its departments/programs and taught by college of allied health faculty with primary appointments in the college.

2. CAH sponsored courses & non-CAH faculty taught - Sponsored by the college of allied health or any of its departments/programs and taught by faculty who do not have a primary appointment in the college (secondary, visiting, contracted, etc.).

3. Non-CAH sponsored courses & non-CAH faculty taught - Sponsored by colleges and departments outside of the college of allied health and taught by faculty outside of the college of allied health.

It is important to keep these organizational structures in mind because the statements which will follow refer to the science related course delivery system under all or each of these organizational structures.

DIRECTIONS FOR ROUND III

1. For this round, two of the three ranking questions and the four open ended questions have been deleted. [These have been re-inserted in this document for the readers benefit.] Except for the concluding questions on the last page and clarification on items 22A, B, & C, the other statements are identical to those found in round II.

2. The numbers below each box indicate how many participants selected each response in round II. The number circled indicates your response.

3. Please retain or change your previous vote by checking the box in the appropriate column to indicate your opinion about each item. If you did not previously respond to an item, this is your last opportunity to do so, and it could make a big difference, as with statement 01.

4. Although you may have a particular course(s) or program(s) in mind consider the appropriateness of each of the following statements for the science related courses as a whole and under the circumstances described.

What professional and academic qualifications should science related course faculty have?	DISAGREE	AGREE	NO OPINION
GENERAL STATEMENTS			
01 The biophysical science knowledge bases which individual allied health professions deem necessary for practice have agreed upon by members of the respective professions.	[ ] 13 nr=5	[ ] 1	[ ] 0
01A REVISED STATEMENT: The biophysical science knowledge bases which individual allied health professions deem necessary for practice have been agreed upon by members of most of the respective professions.	[ ] 17	[ ] 2	[ ] 0

03 Which of the following should be most important in establishing preferred science related course faculty <u>professional</u> credentials?

1 most important 3 least important

a) mission of the university/ academic health center ______

b) mission of the college of allied health ______

c) professional accreditation standards ______

d) no opinion ______

02 Which of the following should be most important in establishing preferred science related course faculty <u>academic</u> credentials?

1 most important 3 least important

a) mission of the university/ academic health center ______

b) mission of the college of allied health ______

c) professional accreditation standards ______

d) no opinion ______

	AGREE	DISAGREE	NO OPINION
04 Allied health credentialed faculty should be able to teach any science related course required of baccalaureate students in their respective professional phase curricula.	[ ] 1 nr=5	[ ] 13	[ ] 0
04A REVISED STATEMENT: Allied health credentialed faculty should be qualified to teach any science related course required of baccalaureate students in their respective professional phase curricula.	[ ] 3	[ ] 16	[ ] 0
QUALIFICATION STATEMENTS			
Science related course faculty should:			
05 Have a doctoral degree.	[ ] 12 nr=1	[ ] 5	[ ] 1
06 Have a health professional credential.	[ ] 3 nr=1	[ ] 13	[ ] 2
07 Show evidence of recent/current research or scholarship.	[ ] 15 nr=1	[ ] 3	[ ] 0
08 Excluding research and scholarship, show evidence of own continuing education.	[ ] 17 nr=1	[ ] 0	[ ] 1

	AGREE	DISAGREE	NO OPINION
09 Have a primary faculty appointment in some unit of the university.	[ ] 17 nr=1	[ ] 1	[ ] 0
10 Hold tenure.	[ ] 1 nr=1	[ ] 13	[ ] 4
11 Hold a senior faculty rank (associate or full professor).	[ ] 1 nr=1	[ ] 15	[ ] 2
12 Graduate students are acceptable as science related course faculty assistants for college of allied health undergraduates.	[ ] 16 nr=1	[ ] 2	[ ] 0
13 Graduate students are acceptable as science related course faculty for college of allied health undergraduates.	[ ] 3 nr=1	[ ] 15	[ ] 0

	AGREE	DISAGREE	NO OPINION
13A ADDITIONAL STATEMENT: Demonstrate effectiveness teaching undergraduate allied health students.	19	0	0
13B ADDITIONAL STATEMENT: Hold a graduate degree in the same or closely related science of the science to be taught.	[ ] 16	[ ] 3	[ ] 0

PLEASE DESCRIBE ANY OTHER QUALIFICATIONS SCIENCE RELATED COURSE FACULTY SHOULD HAVE.

In what roles should science related course faculty engage?

Indicate your opinion for faculty in each of the three categories. I CAH sponsored course and CAH faculty taught. II CAH sponsored course and non-CAH faculty taught. III non-CAH sponsored course and non-CAH faculty taught.

Relative to the science related courses taught, the college of allied health faculty and administration should expect these science related course faculty to:

	CAH Sponsored CAH Faculty			CAH Sponsored non-CAH Faculty			non-CAH Sponsored non-CAH Faculty		
	AGREE	DISAGREE	NO OPINION	AGREE	DISAGREE	NO OPINION	AGREE	DISAGREE	NO OPINION
14. Participate in allied health curriculum planning.	21	0	0	[ ] 17 nr=1	[ ] 1	[ ] 0	[ ] 8 nr=2	[ ] 9	[ ] 0
15 Participate in program accreditation activities.	21	0	0	18 nr=1	0	0	[ ] 9 nr=2	[ ] 8	[ ] 0
16 Participate in collegial dialogue with other college/ program faculty about proposed or revised course goals, objectives, and methods.	20 nr=1	0	0	18 nr=1	0	0	[ ] 16 nr=2	[ ] 1	[ ] 0
17 Provide academic counseling to CAH students.	18 nr=1	0	1	[ ] 11 nr=1	[ ] 7	[ ] 0	[ ] 6 nr=2	[ ] 10	[ ] 1
18 Set course goals.	[ ] 11 nr=7	[ ] 1	[ ] 0	[ ] 17 nr=1	[ ] 1	[ ] 0	[ ] 15 nr=2	[ ] 1	[ ] 1
19 Develop course objectives, syllabi; select textbooks.	[ ] 11 nr=7	[ ] 1	[ ] 0	[ ] 17 nr=1	[ ] 1	[ ] 0	[ ] 15 nr=2	[ ] 1	[ ] 1
20 Choose teaching methods.	12 nr=7	0	0	18 nr=1	0	0	[ ] 14 nr=2	[ ] 2	[ ] 1
21 Conduct basic or applied research.	16 nr =3	0	0	[ ] 14 nr=3	[ ] 1	[ ] 1	[ ] 13 nr=3	[ ] 1	[ ] 2
22 Student evaluation of the science related course(s) should be expected.	21	0	0	17 nr=3	0	0	16 nr=3	0	0

	AGREE	DISAGREE	NO OPINION	AGREE	DISAGREE	NO OPINION
	Relative to Course Taught			Relative to Total Curriculum		
22A ADDITIONAL STATEMENT: Science related course faculty who are members of the profession to which the students aspire and teaching required courses should provide academic counseling to CAH students.	[ ] 14 nr=2	[ ] 3	[ ] 0	[ ]	[ ]	[ ]
22B ADDITIONAL STATEMENT: Science related course faculty (allied health or basic scientist) with CAH primary appointments and teaching required courses should provide academic counseling to CAH students.	[ ] 15 nr=2	[ ] 2	[ ] 0	[ ]	[ ]	[ ]
22C ADDITIONAL STATEMENT: Science related course faculty outside of the CAH and teaching required but non-CAH sponsored courses should provide academic counseling to CAH students.	[ ] 7 nr=1	[ ] 11	[ ] 0	[ ]	[ ]	[ ]

What role should the college of allied health dean and faculty have in the evaluation of science related course faculty who do not have primary appointments in the college?	AGREE	DISAGREE	NO OPINION
DEAN RESPONSIBILITY STATEMENTS			
23 The college of allied health dean should have administrative and academic responsibility for all college sponsored science related courses (no matter where the teaching faculty hold their primary appointment).	[ ] 13 nr=1	[ ] 5	[ ] 0
24 The college of allied health dean should have responsibility for the academic integrity of all required professional phase science related courses (no matter what college or department sponsors them).	[ ] 13 nr=1	[ ] 5	[ ] 0
24A ADDITIONAL STATEMENT: The college of allied health dean should have responsibility for the academic integrity of all required professional phase science related courses sponsored by the CAH.	[ ] 16 nr=1	[ ] 2	[ ] 0
25 Institutions where the college of allied health dean should have academic or administrative course responsibility he should also have responsibility to evaluate the science related course faculty.	[ ] 15 nr=1	[ ] 3	[ ] 0
25A ADDITIONAL STATEMENT: Deans of the respective colleges should have responsibility for the academic integrity of all courses sponsored by their colleges.	[ ] 18	[ ] 1	[ ] 0

Indicate your opinion for faculty in both categories.
I non-CAH faculty teaching CAH sponsored courses.
II non-CAH faculty teaching non-CAH sponsored courses.

Formal college of allied health evaluation of science related faculty who teach required professional phase courses should:	CAH Sponsored non-CAH Faculty AGREE	DISAGREE	NO OPINION	non-CAH Sponsored non-CAH Faculty AGREE	DISAGREE	NO OPINION
26 Be confined to the decision to retain or dismiss the faculty member.	[ ] 2 nr=1	[ ] 16	[ ] 0	not applicable		
27 Be confined to the decision to retain the course as required or not.	[ ] 4 nr=2	[ ] 13	[ ] 0	[ ] 4 nr=3	[ ] 12	[ ] 0
28 Address all expectations the college of allied health has of the faculty member.	18 nr=1	0	0	16 nr=3	0	0
29 Not occur.	0 nr=2	17	0	0 nr=4	15	0
30 Be communicated to the science related course faculty and his/her chair or dean.	18 nr=1	0	0	16 nr=3	0	0
31 Affect merit raise, tenure, and promotion decisions made by the science related course faculty members primary department.	[ ] 16 nr=1	[ ] 2	[ ] 0	[ ] 14 nr=3	[ ] 2	[ ] 0

COMMENTS CONCERNING THE EVALUATION OF SCIENCE RELATED COURSE FACULTY WITHOUT CAH PRIMARY APPOINTMENTS.

What control should the college of allied health faculty and dean have upon the delivery and content of science related courses?

32 Please rank order where the primary responsibility for the allied health curricula should rest. 1 most responsibility 3 least responsibility

a) dean ______________________________
b) faculty____________________________
c) accreditation standards______________

	AGREE	DISAGREE	NO OPINION
33 Responsibility for the allied health curricula should be shared by the faculty and administration.	[ ] 17 nr=1	[ ] 1	[ ] 0
34 Responsibility for the allied health curricula should be shared by all health instructional personnel (class laboratory and clinical) regardless of appointment.	[ ] 16 nr=1	[ ] 2	[ ] 0

Indicate your opinion regarding both categories of courses. I College of allied health sponsored courses. II non-College of allied health sponsored courses.

DEAN RESPONSIBILITY STATEMENTS

The dean should:

	CAH Sponsored			non-CAH Sponsored		
	AGREE	DISAGREE	NO OPINION	AGREE	DISAGREE	NO OPINION
35 Attract and retain qualified faculty to teach these courses.	[ ] 17 nr=1	[ ] 1	[ ] 0	[ ] 6 nr=1	[ ] 11	[ ] 1
36 Identify qualified faculty to teach these courses.	[ ] 12 nr=1	[ ] 6	[ ] 0	[ ] 5 nr=1	[ ] 12	[ ] 1
37 Participate in course development or revisions.	[ ] 2 nr=1	[ ] 16	[ ] 0	[ ] 2 nr=1	[ ] 16	[ ] 0
38 Have an administrative role in the course delivery under all circumstances.	[ ] 13 nr=1	[ ] 4	[ ] 1	[ ] 5 nr=2	[ ] 11	[ ] 1
39 Have an administrative role in the course delivery if the course is limited to allied health students.	not applicable			[ ] 13 nr=2 not applicable=1	[ ] 2	[ ] 1
40 Have an administrative role in the course delivery if there is a transfer of funds to the other college/department for the course.	[ ] 17 nr=1	[ ] 1	[ ] 0	[ ] 17 nr=1	[ ] 1	[ ] 0

FACULTY RESPONSIBILITY STATEMENTS	CAH Sponsored CAH Faculty			CAH Sponsored non-CAH Faculty			non-CAH Sponsored non-CAH Faculty		
	AGREE	DISAGREE	NO OPINION	AGREE	DISAGREE	NO OPINION	AGREE	DISAGREE	NO OPINION
College of allied health faculty who are not teaching science related courses should:									
41 Identify faculty to teach these courses.	[ ] 8 nr=2	[ ] 8	[ ] 1	[ ] 9 nr=1	[ ] 8	[ ] 1	[ ] 1 nr=2	[ ] 5	[ ] 1
42 Have input into the science related course(s) goals - objectives under all circumstances.	[ ] 16 nr=2	[ ] 1	[ ] 0	[ ] 14 nr=1	[ ] 4	[ ] 0	[ ] 5 nr=2	[ ] 11	[ ] 1
43 Have input into the science related course(s) goals - objectives if/when the source is limited to allied health students.	17 nr=2	0	0	[ ] 17 nr=1	[ ] 1	[ ] 0	[ ] 16 nr=2	[ ] 1	[ ] 0
44 Have input into the science related course(s) goals - objectives if/when there is a transfer of funds from the college of allied health to the other college/department.	not applicable			[ ] 17 nr=1	[ ] 1	[ ] 0	[ ] 16 nr=2	[ ] 1	[ ] 0

	CAH Sponsored CAH Faculty			CAH Sponsored non-CAH Faculty			non-CAH Sponsored non-CAH Faculty		
	AGREE	DISAGREE	NO OPINION	AGREE	DISAGREE	NO OPINION	AGREE	DISAGREE	NO OPINION
If and when college of allied health faculty input is warranted the faculty should:									
45 Relay accreditation requirements to the science related course faculty.	21	0	0	21	0	0	15 nr=4	0	0
46 Relay practice situations which the students are likely to encounter to the science related course faculty.	21	0	0	21	0	0	14 nr=5	0	0
47 Recommend course goals.	16 nr=3	0	0	17 nr=2	0	0	[ ] 15 nr=2	[ ] 2	[ ] 0
48 Recommend specific course content.	16 nr=3	0	0	17 nr=2	0	0	[ ] 14 nr=2	[ ] 3	[ ] 0
49 Recommend teaching methods.	[ ] 7 nr=4	[ ] 7	[ ] 1	[ ] 3 nr=2	[ ] 14	[ ] 0	[ ] 2 nr=3	[ ] 14	[ ] 0
50 Recommend course textbooks.	[ ] 11 nr=4	[ ] 3	[ ] 1	[ ] 10 nr=3	[ ] 5	[ ] 1	[ ] 7 nr=3	[ ] 8	[ ] 1

WHAT OTHER ACTIVITIES SHOULD THE FACULTY OR DEAN PERFORM TO ENHANCE THE DELIVERY OF SCIENCE RELATED COURSES TAUGHT BY FACULTY WITHOUT A CAH PRIMARY APPOINTMENT?

APPENDIX P

VOTES BY ROUND FOR STATEMENTS

Table 22

Votes by Round re: Statements 01, 01A, 04, 04A, and for Science Related Course Faculty Qualifications

		Round					Round		
		I	II	III			I	II	III
01	A	16	13	14	09	A	20	17	18
	D	3	1	1		D	1	1	0
	NO	2	0	0		NO	0	0	0
	NR	0	5	3		NR	0	1	0
01A	A	--	17	15	10	A	2	1	0
	D	--	2	2		D	17	13	18
	NO	--	0	0		NO	2	4	0
	NR	--	0	1		NR	0	1	0
04	A	5	1	1	11	A	3	1	0
	D	16	13	17		D	16	15	18
	NO	0	0	0		NO	2	2	0
	NR	0	5	0		NR	0	0	0
04A	A	--	3	1	12	A	18	16	18
	D	--	16	17		D	2	2	0
	NO	--	0	0		NO	1	0	0
	NR	--	0	0		NR	0	1	0
05	A	15	12	14	13	A	2	3	1
	D	6	5	4		D	18	15	17
	NO	0	1	0		NO	1	0	0
	NR	0	1	0		NR	0	1	0
06	A	6	3	3	13A	A	--	19	--
	D	12	13	14		D	--	0	--
	NO	3	2	1		NO	--	0	--
	NR	0	1	0		NR	--	0	--

Table 22--continued

		Round I	II	III			Round I	II	III
07	A	18	15	15	13B	A	--	16	
	D	3	3	3		D	--	3	
	NO	0	0	0		NO	--	0	
	NR	0	1	0		NR	--	0	
08	A	16	17	16					
	D	2	0	1					
	NO	2	1	1					
	NR	0	1	0					

Note. Numbers in left columns refer to the statement number.

Note. A = Agree D = Disagree NO = No Opinion NR = No Response.

Table 23

Votes by Round for Statements 14-22: Science Related Course Faculty Roles by Organizational Structure: Sponsors (S) and Faculty (F)

		CAH S CAH F			CAH S non-CAH F			non-CAH S non-CAH F		
		Round			Round			Round		
		I	II	III	I	II	III	I	II	III
14	A	21	--	--	17	17	17	7	8	9
	D	0	--	--	3	1	1	11	9	9
	NO	0	--	--	1	1	0	3	0	0
	NR	0	--	--	0	0	0	0	2	0
15	A	21	--	--	16	18	--	10	9	10
	D	0	--	--	4	0	--	10	8	8
	NO	0	--	--	1	0	--	1	0	0
	NR	0	--	--	0	1	--	0	2	0
16	A	20	--	--	18	18	--	14	16	17
	D	0	--	--	2	0	--	4	1	1
	NO	0	--	--	0	0	--	2	0	0
	NR	1	--	--	1	1	--	1	2	0
17	A	19	--	--	9	11	13	6	6	7
	D	0	--	--	8	7	5	10	10	10
	NO	0	--	--	3	0	0	4	1	1
	NR	1	--	--	1	1	0	1	2	0
18	A	20	11	16	20	17	17	14	15	16
	D	1	1	1	1	1	1	4	1	1
	NO	0	0	0	0	0	0	3	1	1
	NR	0	7	0	0	1	0	0	2	0
19	A	20	11	17	20	17	17	13	15	16
	D	1	1	1	1	1	1	5	1	1
	NO	0	0	0	0	0	0	3	1	1
	NR	0	7	0	0	1	0	0	2	0

Table 23--continued

		CAH S CAH F			CAH S non-CAH F			non-CAH S non-CAH F		
		Round			Round			Round		
		I	II	III	I	II	III	I	II	III
20	A	20	12	--	20	18	--	--	14	17
	D	1	0	--	1	0	--	--	2	0
	NO	0	0	--	0	0	--	--	1	1
	NR	0	7	--	0	1	--	--	2	0
21	A	20	16	--	16	14	17	12	13	16
	D	1	0	--	3	1	1	2	1	2
	NO	0	0	--	1	1	0	7	2	0
	NR	6	3	--	1	3	0	0	3	0
22	A	21	--	--	20	17	--	19	16	
	D	0	--	--	1	0	--	1	0	
	NO	0	--	--	0	0	--	1	0	
	NR	0	--	--	0	2	--	0	3	

<u>Note</u>. Numbers in left columns refer to the statement number.

<u>Note</u>. A = Agree D = Disagree NO = No Opinion
NR = No Response.

Table 24

Votes in Round III re: Science Related Course Faculty Counseling Roles

		Relative to Course	Relative to Curriculum
22A	A	17	9
	D	1	3
	NO	0	2
	NR	0	4
22B	A	17	11
	D	1	2
	NO	0	1
	NR	0	4
22C	A	7	2
	D	11	10
	NO	0	1
	NR	0	4

Note. Numbers in left columns refer to the statement number.

Note. A = Agree D = Disagree NO = No Opinion NR = No Response.

Table 25

Votes by Round re: Role of CAH Dean in Evaluation of non-CAH Science Related Courses

		Round I	II	III			Round I	II	III
23	A	15	13	15	25	A	13	15	16
	D	6	5	3		D	8	3	2
	NO	0	0	0		NO	0	0	0
	NR	0	1	0		NR	0	1	0
24	A	13	13	15	25A	A	--	18	18
	D	8	5	3		D	--	1	0
	NO	0	0	0		NO	--	0	0
	NR	0	1	0		NR	--	0	0
24A	A	--	16	16					
	D	--	2	1					
	NO	--	0	0					
	NR	--	1	1					

Note. Numbers in left columns refer to the statement number.

Note. A = Agree D = Disagree NO = No Opinion NR = No Response.

Table 26

Votes by Round re: CAH Evaluation of non-CAH Faculty Who Teach Science Related Courses

		Courses sponsored by CAH Round					non-CAH Round		
		I	II	III			I	II	III
26	A	8	2	2	26	A	not applicable		
	D	13	16	16		D			
	NO	0	0	0		NO			
	NR	0	0	0		NR			
27	A	10	4	3	27	A	10	4	4
	D	11	13	15		D	9	12	13
	NO	0	0	0		NO	2	0	0
	NR	0	2	0		NR	0	3	1
28	A	19	18	--	28	A	14	16	--
	D	2	0	--		D	5	0	--
	NO	0	0	--		NO	2	0	--
	NR	0	1	--		NR	0	3	--
29	A	2	0	--	29	A	2	0	--
	D	16	17	--		D	15	15	--
	NO	1	0	--		NO	2	0	--
	NR	2	2	--		NR	2	4	--
30	A	20	18	30	20	A	17	16	--
	D	1	0	--		D	2	0	--
	NO	0	0	--		NO	2	0	--
	NR	0	1	--		NR	0	3	--
31	A	14	16	16	31	A	10	14	15
	D	7	2	2		D	8	2	3
	NO	0	0	0		NO	3	0	0
	NR	0	1	0		NR	0	3	0

Note. Numbers in left columns refer to the statement number.

Note. A = Agree D = Disagree NO = No Opinion NR = No Response.

Table 27

Votes by Round re: Curricula Responsibility

		Round					Round		
		I	II	III			I	II	III
33	A	18	17	18	34	A	13	16	16
	D	3	1	0		D	8	2	2
	NO	0	0	0		NO	0	0	0
	NR	0	1	0		NR	0	1	0

Note. Numbers in left columns refer to the statement number.

Note. A = Agree D = Disagree NO = No Opinion
NR = No Response.

Table 28

Votes by Round re: CAH Dean Responsibility for Science Related Courses

		Courses sponsored by CAH Round					non-CAH Round		
		I	II	III			I	II	III
35	A	19	17	17	35	A	9	6	5
	D	2	1	1		D	10	11	13
	NO	0	0	0		NO	2	1	0
	NR	0	1	0		NR	0	1	0
36	A	13	12	13	36	A	8	5	1
	D	7	6	5		D	12	12	17
	NO	1	0	0		NO	1	1	0
	NR	0	1	0		NR	0	1	0
37	A	5	2	1	37	A	6	2	1
	D	16	16	17		D	15	16	17
	NO	0	0	0		NO	0	0	0
	NR	0	1	0		NR	0	1	0
38	A	15	13	13	38	A	9	5	4
	D	6	4	4		D	11	11	14
	NO	0	1	0		NO	1	1	0
	NR	0	1	1		NR	0	2	0
39	A	not applicable			39	A	13	13	15
	D					D	5	2	1
	NO					NO	2	1	1
	NR					NR	1	3	1
40	A	16	17	18	40	A	16	17	18
	D	2	1	0		D	3	1	0
	NO	0	0	0		NO	1	0	0
	NR	3	1	0		NR	1	1	0

Note. Numbers in left columns refer to the statement number.

Note. A = Agree D = Disagree NO = No Opinion NR = No Response.

Table 29

Votes by Round re: CAH Faculty Responsibility for Science Related Courses by Organizational Structure: Sponsor (S) and Faculty (F)

		CAH S CAH F			CAH S non-CAH F			non-CAH S non-CAH F		
		Round			Round			Round		
		I	II	III	I	II	III	I	II	III
41	A	9	8	9	9	9	10	4	1	0
	D	9	8	9	8	8	8	13	15	17
	NO	3	1	0	4	1	0	4	1	1
	NR	0	2	0	0	1	0	0	2	0
42	A	13	16	16	12	14	15	7	5	7
	D	8	1	2	9	4	3	12	11	11
	NO	0	0	0	0	0	0	2	1	0
	NR	0	2	0	0	1	0	0	2	0
43	A	15	17	--	14	17	18	12	16	18
	D	6	0	--	7	1	0	8	1	0
	NO	0	0	--	0	0	0	1	0	0
	NR	0	2	--	0	1	0	0	2	0
44	A	not applicable			14	17	18	10	16	17
	D				7	1	0	9	1	1
	NO				0	0	0	2	0	0
	NR				0	1	0	0	2	0
45	A	21	--	--	21	--	--	19	15	--
	D	0	--	--	0	--	--	1	0	--
	NO	0	--	--	0	--	--	1	0	--
	NR	0	--	--	0	--	--	0	4	--
46	A	21	--	--	21	--	--	18	14	--
	D	0	--	--	0	--	--	1	0	--
	NO	0	--	--	0	--	--	2	0	--
	NR	0	--	--	0	--	--	0	5	--
47	A	18	16	--	17	17	--	15	15	16
	D	2	0	--	3	0	--	4	2	1
	NO	1	0	--	1	0	--	2	0	0
	NR	0	3	--	0	2	--	0	2	1

Table 29--continued

		CAH S CAH F Round I	II	III	CAH S non-CAH F Round I	II	III	non-CAH S non-CAH F Round I	II	III
48	A	18	16	--	15	17	--	14	14	16
	D	3	0	--	6	0	--	6	3	2
	NO	0	0	--	0	0	--	1	0	0
	NR	0	3	--	0	2	--	0	2	0
49	A	9	7	8	6	3	1	4	2	0
	D	9	7	9	12	14	17	14	14	18
	NO	3	1	0	3	0	0	3	0	0
	NR	0	4	1	0	2	0	0	3	0
50	A	14	11	13	12	10	11	10	7	4
	D	6	3	4	8	5	6	10	8	13
	NO	1	1	1	1	1	1	1	1	1
	NR	0	4	0	0	3	0	0	3	0

Note. Numbers in left columns refer to the statement number.

Note. A = Agree D = Disagree NO = No Opinion
NR = No Response.

APPENDIX Q

COLLEGE PARTICIPANTS

Boston University: Sargent College of Allied Health Professions

Louisiana State University: School of Allied Health Professions

Medical University of South Carolina: College of Health Related Professions

Ohio State University: College of Medicine-School of Allied Health Professions

University of Illinois at Chicago: College of Associated Health Professions

University of Mississippi at the Medical Center: School of Health Related Professions

Virginia Commonwealth University: School of Allied Health Professions

BIBLIOGRAPHY

American Association of Colleges of Pharmacy. (1986). Annual survey of faculty salaries. Bethesda, MD: Author.

American Association of Nurse Anesthetists: Council on Accreditation of Nurse Anesthesia Educational Programs/Schools [AANA]. (1980). Standards and guidelines for accreditation of nurse anesthesia educational programs/schools. Park Rodge, IL: Author.

The American Council on Pharmaceutical Education [ACPE]. (1984). Accreditation standards and guidelines (8th ed.). Chicago, IL: Author.

American Dental Association. Commission on Accreditation of Dental and Dental Auxiliary Educational Programs. (n.d.). Accreditation standards for dental hygiene education programs. Chicago, IL: Author.

The American Dietetic Association. (1976). Essentials for coordinated undergraduate programs in dietetics with self-study guide. Chicago, IL: Author.

American Medical Association. (1977a). Essentials and guidelines of an accredited educational program for the medical technologist. Chicago, IL: Author.

American Medical Association. (1977b). Essentials and guidelines of an accredited educational program for the respiratory therapist. Chicago, IL: Author.

American Medical Association. (1978). Essentials and guidelines of an accredited educational program for histotechnology. Chicago, IL: Author.

American Medical Association. (1980a). Essentials and guidelines of an accredited educational program for the diagnostic medical sonographer. Chicago, IL: Author.

American Medical Association. (1980b). Essentials and guidelines of an accredited educational program for the perfusionist. Chicago, IL: Author.

American Medical Association. (1981a). Essentials and guidelines of an accredited educational program for the medical record administrator. Chicago, IL: Author.

American Medical Association. (1981b). Essentials and guidelines of an accredited educational program for the radiation therapy technologist. Chicago, IL: Author.

American Medical Association. (1982). Essentials of an accredited educational program for the surgeon's assistant. Chicago, IL: Author.

American Medical Association. (1983a). Essential and guidelines of an accredited educational program for the cytotechnologist. Chicago, IL: Author.

American Medical Association. (1983b). Essentials and guidelines of an accredited educational program for the occupational therapist. Chicago, IL: Author.

American Medical Association. (1983c). Essentials and guidelines of an accredited educational program for the radiographer. Chicago, IL: Author.

American Medical Association. (1984). Essentials and guidelines of an accredited educational program for the nuclear medicine technologist. Chicago, IL: Author.

American Medical Association. (1985a). Allied health education directory (13th ed.). Chicago, IL: Author.

American Medical Association. (1985b). Essentials and guidelines of an accredited educational program for the cardiovascular technologist. Chicago, IL: Author.

American Medical Association. (1985c). Essentials and guidelines of an accredited educational program for the physician assistant. Chicago, IL: Author.

American Medical Association. (1986). Allied health education directory (14th ed.). Chicago, IL: Author.

American Medical Association. (1987). Allied health education directory (15th ed.). Chicago, IL: Author.

American Physical Therapy Association. [APTA] (1978). Standards for accreditation of physical therapy educational programs. Alexandria, VA: Author.

American Society of Allied Health Professions [formerly Association of Schools of Allied Health Professions]. (n.d.) 1986 membership directory. Washington, DC: Author.

Anderson, S. A. (1981). An assessment of the academic role of department chairpersons in selected allied health professions (Doctoral dissertation, Saint Louis University, 1981). Dissertation Abstracts International, 42, 4307A.

Arizona Board of Regents. (1982). Arizona University system mission and scope statements. Phoenix, AZ: Author.

Ashley, J. A. (1976). Hospitals, paternalism, and the role of the nurse. New York: Teachers College Press.

Association of Academic Health Centers (1980a). The organization and governance of academic health centers. (Vol. 1). Washington, DC: AAHC.

Association of Academic Health Centers (1980b). The organization and governance of academic health centers. (Vol. 2). Washington, DC: AAHC.

Association of Academic Health Centers (1980c). The organization and governance of academic health centers. (Vol. 3). Washington, DC: AAHC.

Association of Academic Health Centers (1980d). The organization and governance of academic health centers. (Vol. 4). Washington, DC: AAHC.

Association of Academic Health Centers. (1985). 1985 Directory. Washington, DC: Author.

Association of Academic Health Centers. (1986). 1986 Directory. Washington, DC: Author.

Association of Academic Health Centers. (1987). 1987 Directory. Washington, DC: Author.

Association of American Medical Colleges. (1986). Directory of American medical education. Washington, DC: Author.

Association of Schools of Allied Health Professions. (1973). Core concept in allied health. A summary of the ASAHP report. Journal of Allied Health, 2, 97-106.

Barritt, E. R. (1980). Comment on "Interschool relationships in academic health centers." In The organization and governance of academic health centers: Vol. 3. Position Papers (pp. 171-175). Washington, DC: Association of Academic Health Centers.

Barr, J. (1979). A ladder curriculum in clinical microbiology, American Journal of Medical Technology, 45, 532-536.

Bassoff, B. Z. (1983). Interdisciplinary education as a facet of health care policy: The impact of attitudinal research. Journal of Allied Health, 12, 280-286.

Baylor College of Medicine. (n.d.). Baylor College of Medicine 1983-84 1984-85. Houston, TX: Author.

Bell, D. R. (1983). Basic science department in a private medical school. The Physiologist, 26, 275-276.

Blayney, K. D., & Rogers, S. J. (1980-81). Characteristics of outstanding schools of the allied health professions located in academic health centers. Allied Health and Behavioral Sciences, 3, 23-46.

Bledstein, B. J. (1976). The culture of professionalism. New York: W. W. Norton & Company.

Bogdan, R. C., & Biklen, S. K. (1982). Qualitative research for education: An introduction to theory and methods. Boston: Allyn and Bacon, Inc.

Boren, A. R., Dixon, P. N., & Harden, M. L. (1982). Innovation in nutrition education. Journal of the American Dietetic Association, 80, 148-153.

Borg, W. R. & Gall, M. D. (1983). Educational research: An introduction (4th ed.). New York: Longman.

Boston University. (1986). Boston University Sargent College of Allied Health Professions 1986-87. Boston MA: Author.

Brooks, B. A. (1985). Acceptance of physical therapist assistant course work by programs preparing physical therapists. Physical Therapy, 65, 48-50.

Brown, W. E. (1983). Dentistry. In C. H. McGuire, R. P. Foley, A. Gorr, & R. W. Richards, (Eds.), Handbook of health professions education (pp. 51-67). San Francisco: Jossey-Bass.

Buescher, G. K. (1984). Identification of that science and mathematics content needed by medical technologists as perceived by baccalaureate program directors, directors of clinical laboratories, and medical technologists (Doctoral dissertation, Temple University, 1984). Dissertation Abstracts International, 45, 66A.

Burnett, C. N. (1973). A closer look at core. Journal of Allied Health. 2, 107-112.

Carnegie Foundation's classifications of more than 3,300 institutions of higher education. (1987, July 8). The Chronicle of Higher Education, pp. 22-26, 28-30.

Chamings, P. (1984). Ranking the nursing schools. Nursing Outlook, 32, 238-239.

Christal, M. E., & Jones, D. P. (1985). A common language for postsecondary accreditation: Categories and definitions for data collection. Boulder, CO: National Center for Higher Education Management Systems and Washington, DC: Council on Postsecondary Accreditation.

Christensen, G. J. (1972). Professional interaction in academic health centers (Doctoral dissertation, University of Denver, 1972). Dissertation Abstracts International, 33, 3153B.

Christensen, G. J. (1978). Professional interaction in academic health centers. Journal of Nursing Education, 17(8), 11-19.

Clark, B. R. (1983). The higher education system: Academic organization in cross-national perspective. Berkeley, CA: University of California Press.

Clarke, G. R. (1983). A study of the curriculum of medical technology education in Oklahoma (Doctoral dissertation, University of Arkansas, 1983). Dissertation Abstracts International, 45, 2372A.

Clemow, B. (1985-86). Collegiate accreditation. The College Board Review, 138 (Winter), 19-21, 31-34.

Collier, S. N. & Youtsey, J. W. (1979). Development, issues, and education in respiratory therapy. In J. Hamburg (Ed.), Review of allied health education: 3 (pp. 99-115), Lexington, KY: University of Kentucky Press.

Connelly, T. Jr. (1978). Basic organizational considerations for interdisciplinary education development in the health sciences. Journal of Allied Health, 7, 274-279.

Connelly, T. Jr., & Clark, D. (1979). Developing interdisciplinary education in allied health programs (Report No. CE-024-086). Atlanta, GA: Southern Regional Educational Board. (ERIC Document Reproduction Service No. ED 182 525)

Core concept in allied health: A summary of the ASAHP (Association of Schools of Allied Health Professions) Report. (1973). Journal of Allied Health, 2, 97-106.

Council on Postsecondary Accreditation. (1986, October, 2). COPA self-study advisory panel: Findings & recommendations. Washington, DC: Author.

Covey, P. C. (1986). Entry level for physical therapy. In W. G. Hinkle (1986) Specialized programatic accreditation in allied health (Southern Association of Allied Health Deans at Academic Health Centers Monograph No. 1), (pp. 25-33). Memphis, TN: University of Tennessee.

Covey, P. C., & Burke, J. E. (1987). Research and the mission of schools of allied health. Journal of Allied Health, 16, 1-5.

Crispell, K. R. (1980). The origin of chaos: Social and political forces affecting the organization and governance of academic health centers. In The Organization and governance of academic health centers: Vol. 3 Position Papers (pp. 5-19). Washington, DC: Association of Academic Health Centers.

Crispell, K. R., & Vogel, L. L. (1980). University - health center relationships: A reappraisal. In The organization and governance of academic health centers: Vol. 3 Position Papers (pp. 35-48). Washington, DC: Association of Academic Health Centers.

Deans' winter conference to focus on survival of allied health units in higher education: (1987-1988). Trends, (p. 8). Washington, DC: American Society of Allied Health Professions.

Dickey, F. G., Harkins, R. K., & Schermanerhorn, J. W. (Reviewers). (1983, May). Allied health program review. (Available from State University System, Florida Board of Regents, 210C The Collins Building, Tallahassee, FL 32301).

Dickey, F. G., & Miller, J. W. (1972). Federal involvement in nongovernmental accreditation. Educational Record, 53, 138-142.

Doerr, A. H. (1983). Accreditation--academic boon or bane. Contemporary Education, 55(1), 6-8.

Duffin, J. (1976). Physics for anaesthetists. Springfield, IL: Charles C. Thomas.

East Carolina University. (1986). East Carolina University bulletin 1986-1988: Undergraduate catalogue. Greenville, NC: Author.

Ebert, R. H., & Brown, S. S. (1983). Academic health centers. The New England Journal of Medicine, 308, 1200-1208.

Elder, O. C. (1985). Schools of allied health professions and the future: Report of a Delphi study. Journal of Allied Health, 14, 25-32.

Elsass, D. G., & Pigge, F. L. (1980). Opinions of college administrators concerning cooperative accreditation. The North Central Association Quarterly, 55, 25-32.

Emory University. (1986). Emory: Allied health professions 1986/1987. Atlanta, GA: Author.

Evangelauf, J. (1986, November 12). Leaders accuse medical schools of failing society by maintaining status quo. The Chronical of Higher Education, pp. 1, 22.

Evangelauf, J. (1987, November 18). Medical schools urged to revamp curricula and renew recruiting efforts. The Chronicle of Higher Education, pp. A16-17.

Fagan, L. (1982). Teaching biomedical science. Journal of Nursing Education, 21, 38-42.

Fazio, L. S. (1985). The Delphi: Education and assessment in institutional goal setting. In D. S. Corday & M. W. Lipsey (Eds.), Evaluation studies review annual (1986). (pp. 287-297). Beverly Hills, CA: Sage.

Feiker, J. H. (1976). Dental students' and graduates' perceptions on the relevance of selected basic science topics to clinical dentistry (Doctoral dissertation, University of Michigan, 1976). Dissertation Abstracts International, 37, 6290-A.

Ferguson, M. C. (1984). Undergraduate nursing curriculum building: An exploration into the 'sciences' requirements. Journal of Advanced Nursing, 9, 197-204.

Fincher, C. (1978). Importance of criteria for institutional goals. In R. H. Fenshe (Ed.), Using goals in research and planning: New directions for institutional research: Vol. V (pp. 1-18). San Francisco: Jossey-Bass.

Flexner, A. (1910). Medical education in the United States and Canada. New York: D. B. Updike, The Merrymount Press.

Florida Board of Regents, (1983). Allied health program review. (Available from [Dr. Angela Lupo-Anderson, State University System, Florida Board of Regents, 210C The Collins Building, Tallahassee, FL 32301].

Florida Postsecondary Education Planning Commission. (1985). A study of postsecondary education accreditation. (Available from Dr. Thomas E. Furlong, 304 Knott Building, Department of Education, Tallahassee, FL 32301).

Foegelle, W. E. (1984). Characteristics of allied health faculty in academic health centers (Doctoral dissertation, Indiana University, 1984). Dissertation Abstracts International, 45, 359A.

Ford, C. W. (1983). Allied health. In C. H. McGuire, R. P. Foley, A. Gorr, R. W. Richards, and Associates. (Eds.) Handbook of health professions education (pp. 113-126). San Francisco, CA: Jossey-Bass.

Ford, C. W., & Cicarelli, S. M. (1982). A coordinated self-study/site visit in medical technology, occupational therapy and physical therapy. Journal of Allied Health, 11, 291-301.

Frank, P. E. (1982). Job satisfaction of administrators of academic nursing units in higher education as it relates to formal organizational structure. Dissertation Abstracts International, 45, 2771A.

Frank, R. L. (1984). The personal characteristics and professional preparation of allied health education administrator at two- and four-year institutions (Doctoral dissertation, University of South Carolina, 1984). Dissertation Abstracts International, 45, 2771A.

Freeland, T. E. (1986). Alternatives to programmatic accreditation. In W. G. Hinkle (1986) Specialized prgrammatic accreditation in allied health Southern Association of Allied Health Deans at Academic Health Centers, Monograph No. 1, (pp. 34-36). Memphis, TN: University of Tennessee.

Freeland, T. E. (1987-1988). President addresses plan for the 90's. Trends, Washington, DC: American Society of Allied Health Professions.

Freidson, E. (1973). Profession of medicine: A study of the sociology of applied knowledge. New York: Dodd, Mead & Company.

Freidson, E. (1986). Professional powers. Chicago: University of Chicago Press.

Friedman, R. B. (1984). Impact of the evolution in health care delivery on the academic medical center. Journal of Medical Education, 59, 539-545.

French, R. M. (1974). Clinical Laboratory education. In J. Hamburg (Ed.) Review of allied health education: 1 (pp. 120-135). Lexington, KY: University of Kentucky Press.

Freston, J. W. (1976). The role of pharmacology in the education of health care professionals. American Journal of Pharmaceutical Education, 40, 367-369.

Friedrich, O. (1982, September, 27). Five ways to wisdom. Time, pp. 66-72.

George Washinton University. (1986). The George Washington University: School of Medicine and Health Sciences bulletin 1986-1987. Washington, DC: Author.

George Washington University. (n.d.). Allied Health Programs: School of Medicine and Health Sciences: The George Washington University. Washington, DC: Author.

Gerald, M. C. (1976). Current status of undergraduate nonprofessional pharmacology courses taught in colleges of pharmacy. American Journal of Pharmaceutical Education, 40, 239-245.

Gies, W. J. (1926). Dental education in the United States and Canada (Bulletin 19). New York, NY: Carnegie Foundation for the Advancement of Teaching.

Giese, M., & Lawler, M. (1978). Development and Implementation of a PSI [personalized system of instruction] course in human physiology. Journal of Allied Health, 1, 268-273.

Ginzberg, E. (1985). Academic health centers: A troubled future. Health Affairs, 4(2), 5-21.

Goldmark, J. (1923). Nursing and nursing education in the United States: Report of the commission for the study of nursing education. New York: Macmillan.

Grace, H. K. (1983). Nursing. In C. H. McGuire, R. P. Foley, A. Gorr, & R. W. Richards (Eds.) Handbook of health professions education (pp. 92-112). San Francisco: Jossey-Bass.

Granger, D. N. (1983). Basic science department in a state-funded medical school. The Physiologist, 26, 276-278.

Hahnemann University. (n.d.). Bulletin 1986-1988: School of Allied Health Professions. Philadelphia, PA: Author.

Harris, S. S. (Ed.). (1987). 1986-87 Accredited institutions of postsecondary education. Washington, DC: American Council on Education.

Hart, M. (1979). Revolution in dietetic education. In J. Hamburg (Ed.), Review of allied health education: 3 (pp. 116-128). Lexington, KY: University of Kentucky Press.

Heaney, R. P., & Barger-Lux, M. J. (1984). Today's crisis in university-provided education in the health professions. Educational Record, 65(4), pp. 42-47.

Hein, J. W. (1974). The dilemma in dental education. In J. Hamburg (Ed.) Review of allied health education: 1 (pp. 93-119). Lexington, KY: University of Kentucky Press.

Hekimian, S. (1984). Criteria for the institution evaluation of community college staff development programs (Doctoral dissertation, University of Florida, 1984). Disssertation Abstracts International, 45, 2738A.

Henderson, M. H. (1980). The future of academic health centers. In The organization and governance of academic health centers: Vol. 3 Position Papers (pp. 67-78). Washington, DC: Association of Academic Health Centers.

Hinkle, W. G. (Ed.). (1986). Specialized programatic accreditation in allied health (Southern Association of Allied Health Deans at Academic Health Centers. Monograph No. 1). Memphis, TN: University of Tennessee.

Hinkle, W. G. (1986). Speech pathology and physical therapy: Some background related to entry level. In W. G. Hinkle (Ed.), Specialized programatic accreditation in allied health Southern Association of Allied Health Deans at Academic Health Centers, Monograph No. 1 (pp. 34-36). Memphis, TN: University of Tennessee.

Hogness, J. R., & Akin, G. C. (1977). Administration of education programs in academic health centers. The New England Journal of Medicine, 296, 656-663.

Howard, R. D., & Lewis, D. E. (1974). Evolution of the physician's assistant. In J. Hamburg (Ed.) Review of allied health education: 1 (pp. 181-200). Lexington, KY: University of Kentucky Press.

Howard University. (n.d.). Howard University: Opportunity discovery challenge. Washington, DC: Author.

Indiana University. (1985). Indiana University bulletin: Division of Allied Health Sciences. Bloomington, IN: Author.

Interdisciplinary panel discussion: Coordinating and optimizing educational effects between basic science faculty and clinical faculty. (1975). American Journal of Pharmaceutical Education, 39, 573-588.

Jacobsen, M. L. W. (1977). Perceptions of inter-disciplinary education within health sciences centers (Doctoral dissertation, Texas A & M University, 1977). Dissertation Abstracts International, 38, 3621-2B.

Jason, H., & Westberg, J. (1982). Teacher and teaching in U.S. medical schools. Norwalk, CT: Appleton-Century-Crofts.

Johnson, J. A. (1974). Occupational therapy. In J. Hamburg (Ed.) Review of allied health education: 1 (pp. 201-229). Lexington, KY: University of Kentucky Press.

Kelley, E. K. (1975). A study of identity of administrators and faculty of three baccalaureate programs in selected allied health science schools and departments (Doctoral dissertation, University of Virginia, 1975). Dissertation Abstracts International,36, 1638B.

King, E. C., & Breegle G. (1983). A comparison of administrator, faculty/clinician, and student needs to facilitate statewide planning in allied health education. Journal of Allied Health, 12, 103-116.

Kleinfelter, L. L. (1976). A comparative study of the organizational structures of schools of allied health professions (Doctoral dissertation, University of Cincinnati, 1976). Dissertation Abstracts International, 37, 2755B.

Koontz, H. (1971). Appraising managers as managers. New York: McGraw-Hill.

Krieger, P. J. (1977). Bio-organic content for the allied health programs of Florida community colleges (Doctoral dissertation, Florida Atlantic University, 1977). Dissertation Abstracts International, 38, 133B.

Kruzas, A. T. (Ed.) (1980). Medical and health information directory. Detroit: Gale Research Company-Book Tower.

Lasswell, W. L., & Mattea, E. J. (1984). An elective didactic course in pharmacy and nutrition practice. American Journal of Pharmaceutical Education, 48, 40-42.

Lemmerman, J. L. N. (1976). Nursing and medical school organizational interaction, and perceptions about physician/nurse roles and relationships. Dissertation Abstracts International, 37, 6054B.

Levine, A. (1978). Handbook on undergraduate curriculum. San Francisco: Jossey-Bass.

Levine, D. O. (1986). The American college and the culture of aspiration, 1915-1940. Ithaca, NY: Cornell University Press.

Lewis, D. E. (1984). Characteristics of selected Delphi studies and their perceived impact in higher education (Doctoral dissertation, University of Florida, 1984). Dissertation Abstracts International, 45, 2682A.

Lewis, S. M. (1981). Pathophysiology Content in Baccalaureate Programs. Journal of Nursing Education, 20(2), 32-36.

Lindeman, C. A. (1981). Priorities within the health care system: A Delphi survey. Kansas City, MO: American Nurses' Association.

Linstone, H. A. & Turoff, M. (Eds.). (1975). The Delphi method: Techniques and applications. Reading, MA: Addison-Wesley.

Lostetter, J. O. (1981). Leadership and organizational behavior: Implications toward the effective and efficient management of the modern academic health centers (Doctoral dissertation, George Peabody College for Teachers of Vanderbilt University, 1981). Dissertation Abstract International, 42 1880A.

Louisiana State University. (1986). Catalog/Bulletin 1986-87: Medical Center. Baton Rouge, LA: Author

Ludmerer, K. M. (1983). The rise of the teaching hospital in America. The Journal of the History of Medicine and Allied Sciences, 38, 389-414.

Ludmerer, K. M. (1985). Learning to heal: The development of American medical education. New York: Basic Books, Inc.

Mayo Foundation. (n.d.). Mayo School of Health-Related Sciences. Rochester, MN: Author.

McTernan, E. (1972). Core curriculum. In E. J. McTernan and R. D. Hawkins, Jr. (Eds.). Educating personnel for the allied health professions and services. (pp. 167-171). St. Louis: C. V. Mosby Co.

Medical College of Georgia. (1985). Medical College of Georgia catalog. Augusta, GA: Author.

Medical College of Georgia. (1986). Supplement, July 1986: Medical College of Georgia catalog. Augusta, GA: Author.

Medical College of Ohio. (n.d.). Medical College of Ohio School of Allied Health 1985-87 bulletin. Toledo, OH: Author.

Medical University of South Carolina. (n.d). Bulletin of the Medical University of South Carolina 1986-1988. Charleston, SC: Author.

Meek, D. A. (1970). Program for educational mobility for health manpower (The basic sciences) (Report No. VT 012 909). San Francisco, CA: Coordinating Council for Education in the Health Sciences for San Diego and Imperial Counties. (ERIC Document Reproduction Service No. ED 054 332)

Meyers, F. H., Jawetz, E., & Goldfien, A. (1980). Review of medical pharmacology (7th ed.). Los Altos, CA: Lange Medical Publications.

Miles, M. B. & Huberman, A. M. (1984). Drawing valid meaning from qualitative data: Toward a shared craft. In D. S. Corday & M. W. Lipsey (Eds.) Evaluation studies review annual (1986). (pp. 397-407). Beverly Hills, CA: Sage.

Miller, M. W., Beckham, T. W., & Pathak, D. S. (1983). Mission and goals of allied health educational institutions. Journal of Allied Health, 12, 11-20.

Morris, A. L. (1980). Inter-school relationships in academic health centers. In The organization and governance of academic health centers: Vol. 3 Position Papers (pp. 155-167). Washington, DC: Association of Academic Health Centers.

Mrtek, R. G. (1976). Pharmaceutical education in these United States--An interpretive historical essay of the twentieth century. American Journal of Pharmaceutical Education, pp. 339-365.

Nash, N. (1978). Delphi and educational research: A review. Minneapolis: University of Minnesota. (ERIC Document Reproduction Service No. 151950)

National Commission on Allied Health Education [NCAHE]. (1980). The future of allied health education. San Francisco: Jossey-Bass.

National League for Nursing [NLN]. (1979). Historical perspective of NLN's participation in the ANA credentialing study (Report No. 1). New York, NY: Author.

National League for Nursing. (1980). Self-study manual: Guidelines for preparation of the self-study report (Publication No. 15-1955). New York, NY: Author.

National League for Nursing. (1986). Nursing data review 1985. New York: Author.

Needham, P. L. (1969). Educational administration in curriculum making in selected university schools. Journal of Dental Education, 33, 145-149.

Neidle, E. A. (1985). Gies redux: A time to look at basic sciences in the dental curriculum. Journal of Dental Education, 49, 14-17.

Nevo, D. (1983). The conceptualization of educational evaluation: An analytical review of the literature. Review of Educational Research, 53, 117-128.

Nyquist, E. B. (1981). Quality, quangos, and the states. The North Central Association Quarterly, 55, (winter), 342-355.

Ohio State Univers[ity. (1985). The Ohio State University bulletin: College of Medicine 1985-1986: School of Allied Medical Professions. Columbus, OH: Author.

Orlans, H. (1980, Feb./Mar.). The end of a monopoly? On accrediting and eligibility. Change, pp. 32-37.

Osteopathic Medical Center of Philadelphia. (n.d.). School of Allied Health catalog. Philadelphia, PA: Author.

Pandolfo, M. V. Sr. (1977). Education for the medical record profession. In J. Hamburg (Ed.) Review of allied health education: 2 (pp. 35-53). Lexington, KY: University of Kentucky Press.

Pazdernik, L., & Walaszek, J. (1983). A computer-assisted teaching system in phamacology for health professionals. Journal of Medical Education, 58 341-348.

Pellegrino, E. D. (1975). The academic role of the vice president for health sciences: Can a walrus become a unicorn? Journal of Medical Education, 50, 221-228.

Pennsylvania State University. (1986). Bulletin: The Pennsylvania State University: Baccalaureate degree programs. University Park, PA: Author.

Perkin, J. E., & Crandall, L. A. (1985). A survey of nutrition education in curricula of physician assistant training programs. Journal of Nutrition Education, 17, 185-187.

Petersdorf, R. G., & Wilson, M. P. (1982). The four horsemen of the apocalypse. Journal of the American Medical Association, 247, 1153-1161.

Phelps, J. L., Steves, A. M., Klimowski, L. L., Hickenbottom, R. S., & Gingher, M. C. (1985). Into the looking glass: Self-assessments for allied health faculty development. Journal of Allied Health, 14, 43-51.

Pitkow, H. S., & Davis, R. H. (1975). Basic science education: A singular comparison between podiatric and general medicine. Journal of Podiatric Medical Education, 6, 8-11.

Pollock, S. E. (1986). Top ranked schools of nursing: The role of the dean. Journal of Nursing Education, 25, 314-318.

Pyne, F. (1975). An administrative experiment in allied health: The Mankato model. Journal of Allied Health, 4, 13-22.

Rhoton, M. F., & Gravenstein, J. S. (1977). University education for nonphysician health professionals in anesthesia. In J. Hamburg (Ed.) Review of allied health education: 2 (pp. 1-18). Lexington, KY: University of Kentucky Press.

Riley, I. K. (1978). Drug information requirements of recently graduated professional nurses. Drug Information Journal, 12, 5-7.

Robinson, J. E. (1987). Separate or integrated pharmacology content? Nursing Outlook, 35, 185-188.

Rogers, D. E., & Blendon, R. J. (1978). The academic medical center: A stressed American institution. The New England Journal of Medicine, 298, 940-950.

Rosenfeld, M. H. (1972). Organizing for allied health education in educational institutions. In E. J. McTernan & R. D. Hawkins Jr. (Eds.) Educating personnel for the allied health professions and services (pp. 13-25). St. Louis, MO: C. V. Mosby Company.

Roueche, J. H. (1976). A place to begin: A systems approach to instruction (pp. 1-8). In C. W. Ford and M. K. Morgan (Eds.), Teaching in the health professions. St. Louis: C. V. Mosby Co.

Rudolph, F. (1978). Curriculum. New York: Jossey-Bass.

Sachs, H. G., & Reynolds, W. A. (1983). Graduate programs in health sciences. In C. H. McGuire, R. P. Foley, A. Gorr, R. W. Richards, and Associates (Eds.), Handbook of health professions education (pp. 141-161). San Francisco, CA: Jossey-Bass.

Saint Louis University. (1985). Saint Louis University: General bulletin. Saint Louis, MO: Author.

Santangelo, M. V. (1981). The history and development of United States Dental Education. Journal of Dental Education, 45, 619-627.

Savitt, T. L., & Kopperl, S. (1982). Health care from early to modern times. In M. V. Boyles, M. K. Morgan, & H. H. McCaulley (Eds.), The health professions (pp. 3-21). Philadelphia: W. B. Saunders.

Schermerhorn, J. W. (1986). Quality assurance of allied health education. In W. G. Hinkle (1986) Specialized programatic accreditation in allied health Southern Association of Allied Health Deans at Academic Health Centers, Monograph No. 1, (pp. 19-24). Memphis, TN: University of Tennessee.

Schramm. C. J., Renn, S. C., & Biles, B. (1986). Controlling hospital cost inflation: New perspectives on state rate setting. Health Affairs, 5 (3), 22-23.

Scully, R. M. (1977). Physical therapy education. In J. Hamburg (Ed.) Review of allied health education: 2 (pp. 148-159). Lexington, KY: University of Kentucky Press.

Semrow, J. J. (1982). A brief history and background of the accreditation process. The North Central Association Quarterly, 56, 383-393.

Simmons, J. L., & McCall, G. J. (1985). Social research: The craft of finding out. New York: Macmillan.

Sirota, L. S. H. (1981). Teaching biochemistry to dietetics students: Is there any concurrence among instructors on what students should know? (Doctoral dissertaion, Columbia University Teachers College, 1981). Dissertation Abstracts International, 41, 4467B.

Sloan, F. A., & Valvona, J. (1986). Uncovering the high costs of teaching hospitals. Health Affairs, 5(3), 68-85.

Soule, A. B. (1974). Radiologic technology. In J. Hamburg (Ed.) Review of allied health education: 1 (pp. 136-180). Lexington, KY: University of Kentucky Press.

Southern Association of Allied Health Deans at Academic Health Centers. (1985). Standards for the accreditation of academic units (colleges, schools, divisions) of allied health professions. Memphis, TN: University of Tennessee.

Southern Association of Allied Health Deans at Academic Health Centers. (1986). Specialized programatic accreditation in allied health (Monograph No. 1). Memphis, TN: University of Tennessee.

The Southern Association of Colleges and Schools. (1975). Standards of the college delegate assembly. Atlanta, GA: Author.

Stark, J. S., & Lowther, M. A. (n.d.). Executive Summary of the University of Michigan professional preparation study project survey. Ann Arbor, MI: University of Michigan, Center for the Study of Higher and Post-secondary Education.

Stark, J. S., Lowther, M. A., & Hagerty, B. K. (1987). Faculty perceptions of professional preparation environments. Journal of Higher Education, 58, 530-559.

Stark, J. S., Lowther, M. A., Hagerty, B. M. K., & Orczyk, C. (1986). A conceptual framework for the study of preservice professional programs in colleges and universities. Journal of Higher Education, 57, 231-258.

Stark, J. S., & Morstain, B. R. (1978). Educational orientations of faculty in liberal arts colleges. Journal of Higher Education 49, 420-437.

State University of New York at Buffalo, [SUNY-Buffalo] (n.d.). State University of New York at Buffalo: School of Health Related Professions: Undergraduate programs 1985-1987. Buffalo, NY: Author.

State University of New York Health Science Center at Brooklyn [SUNY-Brooklyn, formerly Downstate], (n.d.). College of Health Related Professions: Bulletin 1985-1987. Brooklyn, NY: Author.

State University of New York Health Science Center at Syracuse [SUNY-Syracuse, formerly Upstate]. (n.d.). College of Health Related Professions: 1985-86 Prospectus. Syracuse, NY: Author.

Stufflebeam, D. I., Foley, W. J., Gephart, W. J., Guba, E. G., Hammond, R. I., Merriman, H., & Provus, M. M. (1971). Educational evaluation and decision making. Itasca, IL: F. E. Peacock Publishers, Inc.

Talbert, R. L., & Walton, C. A. (1976). An integrated approach to instruction in pharmacology and therapeutics. American Journal of Pharmaceutical Education, 40, 369-377.

Temple University. (n.d.). Temple University: College of Allied Health Professions. Philadelphia, PA: Author.

Temple University. (n.d.). Temple University: Undergraduate bulletin 1986-87. Philadelphia, PA: Author.

Texas Tech University Health Sciences Center. (n.d.). Texas Tech University Health Sciences Center bulletin 1984-86: School of Allied Health. Lubbock, TX: Author.

Thier, S. O. (1987). Reexamining the principles of medicine. Health Affairs, 6 (4), 70-74.

Treblow, M., Daly, J. M., & Sarquis, J. L. (1984). A syllabus for a one-semester chemistry course for health professions. Journal of Chemical Education, 61, 620-621.

Tucker, A. (1981). Chairing the academic department: Leadership among peers. Washington, DC: American Council on Education.

Tucker, A., & Mautz, R. B. (1978). Involvement of statewide governing boards in accreditation. Educational Record, 59, 314-322.

University of Alabama at Birmingham. (1985). UAB bulletin 1985-1987: School of Community and Allied Health. Birmingham, AL: Author.

University of Arizona. (1985). The University of Arizona record: General catalog 1985-1987. Tucson, AZ: Author.

University of Arkansas for Medical Sciences. (n.d.). Catalog 1986-87: College of Health Related Professions. Little Rock, AR: Author.

University of Connecticut. (1986). The University of Connecticut bulletin 1986-1987: General catalog and undergraduate announcement. Storrs, CT: Author.

University of Illinois at Chicago. (n.d.). UIC: College of Associated Health Professions 1986-88 catalog. Chicago, IL: Author.

University of Kentucky. (1985). The University of Kentucky: College of Allied Health Professions. Lexington, KY: Author.

University of Louisville. (1985). University of Louisville: Allied Health 1985-1987. Louisville, KY: Author.

University of Medicine and Dentistry of New Jersey. (n.d.). School of Health Related Professions. Newark, NJ: Author.

University of Minnesota. (1985). Undergraduate health sciences: University of Minnesota bulletin. Minneapolis, MN: Author.

University of Mississippi at the Medical Center. (n.d.). The University of Mississippi at the Medical Center: 1986-1987 bulletin. Jackson, MS: Author.

University of Nebraska Medical Center. (1985). Bulletin of the School of Allied Health Professions. Omaha, NE: Author.

University of Oklahoma. (1985). The University of Oklahoma Health Sciences Center Oklahoma City Campus: Undergraduate degree programs. Oklahoma City: Author

University of Osteopathic Medicine and Health Sciences. (n.d.). Physician assistant program: College of Biological Sciences. Des Moines, IA: Author.

University of Texas Health Science Center at Dallas. (n.d.). School of Allied Health Sciences. Dallas, TX: Author.

University of Texas Medical Branch at Galveston. (n.d.). The University of Texas School of Allied Health Sciences at Galveston: Bulletin 1984-86. Galveston, TX: Author.

University of Texas Medical Branch at Galveston. (1985). 1985 Supplement to 1984-86 bulletin of the University of Texas School of Allied Health Sciences at Galveston. Galveston, TX: Author.

University of Texas Health Science Center at San Antonio. (1986). Applicant viewbook: The School of Allied Health Sciences. San Antonio, TX: Author.

University of Utah. (n.d.). Well care. Salt Lake City, UT: Author.

University of Vermont. (n.d.). UVM: School of Allied Health Sciences. Burlington, VT: Author.

University of Wisconsin-Madison. (1985). Bulletin: School of Allied Health Professions. Madison, WI: Author.

Vaught, J. E. (1986). The southern deans-move ahead!! In W. G. Hinkle Specialized programatic accreditation in allied health (Southern Association of Allied Health Deans at Academic Health Centers, Monograph No. 1.), pp. 37-40. Memphis, TN: University of Tennessee.

Virginia Commonwealth University. (1984). Medical College of Virginia bulletin 1984-86. Richmond, VA: Author.

Vittetoe, M. C. (1983). A study of learning style preferences of medical technology and physical therapy students. American Journal of Medical Technology. 49, 661-664.

Wake Forest University. (1986). Physician assistant program. Winston-Salem, NC: Author.

Warfield, E. D. (1971). The expansion of our great universities. In J. C. Stone & D. P. De Nevi (Compilers), Portraits of the American university 1890-1910 (pp. 24-38). San Francisco: Jossey-Bass Inc. (Orignial work published 1901).

Watson, S., Meyer, A., & Wotman, S. (1987). Factors affecting applications to professional schools of six professions (medicine, dentistry, nursing, law, social work, and public health). Journal of Dental Education, 51, 130-136.

Wayne State University. (n.d.). Wayne State University bulletin 1986-87. Detroit, MI: Author.

Weil, W. B. (1970). The dilemma of medical curriculum innovation for the university basic science departments. Journal of Medical Education, 45, 689-693.

Weisbord, M. R., Lawrence, P. R., & Charns, M. P. (1978). Three dilemmas of academic medical centers. The Journal of Applied Behavioral Science, 14 284-304.

Wilson, M. P., & McLaughlin. C. P. (1984). Leadership and management in academic medicine. San Francisco: Jossey-Bass.

Wilson, S. L. (1977). The influence of allied health deans on their academic organization (Doctoral dissertation, State University of New York at Buffalo, 1977). Dissertation Abstract International, 38, 03A 1263-A.

Wise, S. A. (1979). A study of organizational features of schools of allied health professions located in academic health centers (Doctoral dissertation, University of Utah, 1979). Dissertation Abstracts International, 39, 6463A.

Woods, N. J. (1978). A technique for the assessment of individual needs in relation to organizational goals for a community college staff development. (Doctoral dissertation, University of Florida, 1977). Dissertation Abstracts International, 39, 64A.

Wutka, P. B. & Baxter, D. H. (1981). A growth and development course for allied health majors. Journal of Allied Health, 10 248-253.

Year-end highlight. (1986-1987, December-January). Professional regulation news, (p. 1.) Washington, DC: National Commission for Health Certifying Agencies.

BIOGRAPHICAL SKETCH

Zolika Heath was born in Boston, Massachusetts. When she was not in public, private, or parochial school she traveled with her parents who were in vaudeville and television. She graduated from the Mount Siani Hospital School of Nursing in New York City. After a stint as an emergency room nurse she specialized in anesthesia. She then worked for several years as a nurse anesthetist at Memorial Sloan Kettering Institute for Cancer and Allied Disease.

She began her college education in 1970 at the University of Florida and graduated with a baccalaureate in health science education, magna cum laude, and later she received a masters degree. She then returned to the health care arena to teach in nurse anesthesia programs. Most of the ensuing years were spent on the faculty with the School of Community and Allied Health of the University of Alabama at Birmingham, where she directed the nurse anesthesia program.

While at Alabama, association with individuals from many health professions expanded her interests in all of health professional education. In time, developing these

interests meant another sojourn in school. Because of the program offered, faculty, and previous positive experiences at the University of Florida she returned to pursue doctoral studies.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a consideration for the degree of Doctor of Philosophy.

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